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1989

Yearbook of Agriculture

Farm Management

How To Achieve Your

Farm Business Goals

Foreword

Clayton Yeutter, *Secretary of Agriculture*

Farming has never been easy. But sophisticated farm management skills are imperative today.

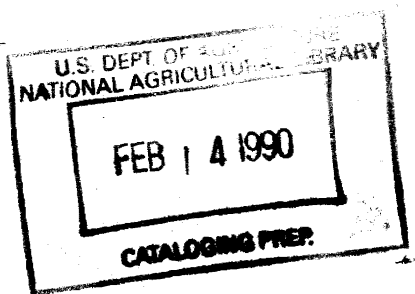
I've been a farmer all my life, and I've learned from personal experience that seemingly small farm management steps can make a big difference in profits. That in turn affects a family's quality of life, and maybe even economic survival. Actions like keeping better records, doing a cash-flow analysis, taking an Extension course, attending a seminar, and running computer analyses of alternative enterprises—all can contribute to a farm's success.

Management does make a difference. It is one of the reasons American agriculture is so competitive internationally. Only talented managers can succeed in today's tough business environment, where our farmers must face not only the competition of their neighbors, but often that of the government treasuries of other nations. Skillful farm management is vital if we are to prosper in such a demanding, and often even hostile, environment. A yearbook on farm management is long overdue.

Farmers work with four principal resources: Land, labor, capital, and management. This book is designed to enhance one of the essential resources—the skills of those who manage American farms. In this book the authors offer American farmers the most up-to-date information on farm management that is available.

Farmers don't just "grow things." They run businesses. They must be concerned about the bottom line. But farming is not *just* business; farming adds up to more than profits. Farm management means the sum total of activities—planning, implementation, and control—that are necessary to accomplish the farm family's goals; whatever they may be.

I believe that American farmers will always be equal to the challenges facing them, and this book is dedicated to helping them survive and succeed.



Preface

Deborah Takiff Smith, *Yearbook Editor*

This yearbook aims to help farmers and farm managers make better business decisions.

FARM MANAGEMENT: How To Achieve Your Farm Business Goals offers practical information from university teachers and Extension System experts, as well as from farmers and other business people.

To be successful, operators of America's 2.1 million farms need to employ the very latest and best business management principles and techniques. Business management skills are crucial. That is true whether the farmer is controlling over \$1 million in business assets and has more than \$250,000 in annual sales, or whether he or she sells less than \$40,000 in products and must rely on nonfarm earnings to keep the family on the land.

The book was written primarily for:

- Owner-operators, renters, and professional farm managers,
- Managers with sophisticated experience, beginners, and those still planning their entry into farming

The ideas in it can be used anywhere in the country, and they apply to any farm enterprise.

For other readers, this yearbook may help provide a better understanding of the challenges that farming entrepreneurs and managers face.

Is farming a business or is it a way of life? Usually it is both. For most farm families, profit is a farm business goal, but farm managers each have their own additional goals—which may include maintaining a lifestyle, passing the farm on to family members, or protecting the land under their care.

The focus throughout the book is on individual farmers making decisions. Case studies reveal real farm managers solving real problems.

As farming changes dramatically, so does farm management. In this yearbook, each chapter contains state-of-the-art information on how today's farm managers make decisions on the use of their resources—land, labor, capital, and management skill.

Part I describes what farm managers do, who they are, and what makes them successful.

Part II examines strategic farm management—how the big decisions are made about such issues as setting goals, evaluating risk, choosing enterprises, starting or expanding the farm, and incorporating the business. It looks at five farm families who have made major strategic changes.

Part III turns to tactical management—the specific business tools that farm managers use every day in controlling the purse strings of their operations. These tools include computer programs for keeping records and evaluating alternative actions; tax management approaches; accounting methods; comparative analysis; and whole-farm budgets, enterprise budgets, and comparative budgets.

In Part IV, experts recommend how to use the key resources of farming—land, water, credit, labor, machinery, livestock facilities, and the managers' time. One chapter focuses specifically on the management of small or limited-resource farms.

Part V considers the relationship of farming to the physical environment. It takes a special look at low-input sustainable agriculture (LISA).

Where do farmers get information to help them make decisions, and how do they select what they can really use from the barrage of material available? Part VI offers some answers. It points the way to information sources in print, broadcast outlets, computer programs, on-line data bases, and other media.

Ongoing education and access to state-of-the-art expertise are essential to successful farmers today. Part VII describes public and private institutions at community, State, and national levels that offer learning opportunities.

Part VIII looks toward the future. It suggests reasons that today's farmers need to farm smart, or manage well, in order to survive in the changing world. Increased competition, environmental concerns, the need to diversify, new production technologies, low-input farming approaches—all call for heightened management skills as farmers constantly respond to change.

Marketing is an important aspect of management, and the 1988 Yearbook, *Marketing U.S. Agriculture*, is a suggested companion piece to this volume.

Many people offered their resources of talent and energy to make this book. Buel F. Lanpher, National Program Leader for Farm Management in USDA's Extension Service, was co-chair with me of the 1989 Yearbook Committee. He located key experts to serve on the committee

and to write many of the chapters. Other committee members who helped select the topics and find the authors include:

William H. Briscoe, *Farmers Home Administration*
Howard W. (Bud) Kerr, *Cooperative State Research Service*
Earl I. Fuller, *Minnesota Extension Service*
A. Gene Nelson, *Oregon State University*
Jane Ross, *Cooperative State Research Service*
Daniel B. Smith, *Clemson University*
W. Fred Woods, *Extension Service*

In addition, Ben Blankenship (Economics Management Staff), Judith Bowers (Extension Service), Neill Schaller (Cooperative State Research Service), Bob Norton (Agricultural Research Service), Bill Hanson (Federal Crop Insurance Service), Ray Waggoner (Agricultural Stabilization and Conservation Service), and Stan Prochaska (Office of Information) helped plan the book.

The production team members take the authors' first drafts and turn them into a book. They include:

Art Director: Vincent Hughes,
Design Division, Office of Information

Designer: Richard Barnes,
formerly Design Division, Office of Information

Copy Editor: Kotler Editorial Associates,
on contract to Special Programs Division, Office of Information

Composition Coordinator: Joseph Stanton,
Electronic Publishing Branch, Printing Division,
Office of Information

Typesetter: Carolyn Evans,
Electronic Publishing Branch, Printing Division,
Office of Information

Photo Coordinator: Larry Rana,
Photography Division, Office of Information

Printers: Warren Bell and Jim Cecil,
Printing Division, Office of Information

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Part I

Farm Managers:

Who Are They and

What Do They Do?

What Do Farm Managers Do?

Whether you run a part-time crop farm with 150 acres of corn and soybeans or a 2,000-acre spread with a large cattle feeding operation grossing more than \$1 million each year, your management determines how effectively your land, labor, and capital resources are used. Two farms, side by side with the same physical resources, markets, labor availability, and equity situation, can generate very different profits and losses at the end of the same year. The difference in large measure can be attributed to management.

In many farm businesses, the owner-operator is the manager as well as one of the principal laborers. These two major resources, management and labor, are tied together in one person. While the labor activities are always more imminent, owner-operators must recognize and give priority to management time. Statements such as "I don't have time to analyze my books" or "All markets have about the same prices" indicate that management is not getting the attention it deserves. Management time is of primary importance to the success of any farm.

What Managers Do

When the cows get out and the fence is down, there is not much question about what needs to be done: Find the cows, get help if needed, and fix the fence.

If you are the manager and the principal worker on this farm where the cows got out, some mixture of management and labor is required to get the job done. Yet no time was wasted in deciding which was which. Priority was established to get the job done in a hurry and resources were mobilized to do it.

It is not hard to recognize that making decisions is part of management. Getting the cows back into the pasture and fixing the fence is mostly labor. Deciding how to fix the fence and what to use, mobilizing the labor, and determining why the cows got the fence down to begin with are all management. Recognizing that something may have been amiss, such as not checking the fence recently or not having enough feed for the cows in the pasture, is part of management as well.

Robert A. Milligan and Bernard F. Stanton, Professors of Agricultural Economics, Cornell University, Ithaca, NY

Here are some of the things farm managers do:

- Set goals and objectives
- Recognize and identify problems
- Respond and act when problems occur
- Seek, compile, and utilize relevant information
- Consider and analyze alternative courses of action
- Make specific decisions
- Carry out decisions or take action
- Accept responsibility for these decisions
- Evaluate the results of these decisions
- Develop training programs for family members and employees
- Direct and evaluate family members and employees
- Make buy and sell decisions
- Control financial operations
- Organize the use of resources
- Establish the timing of operations
- Monitor operations and check up on everything

While there is overlap in this list, it could easily be expanded. The list does indicate, however, that there are a lot of things that managers do. That is why good full-time managers are crucial to most sizable businesses and why time must be set aside for management in any business—even if the principal laborer is also the manager.

Management Functions

Textbooks on farm and general business management discuss management functions early and often. Different terms may be used, but the concepts remain the same. At the core of these concepts is a set of goals and objectives for the business, developed and understood with clarity by the owner, by management, and by labor. Expectations about levels of annual earnings

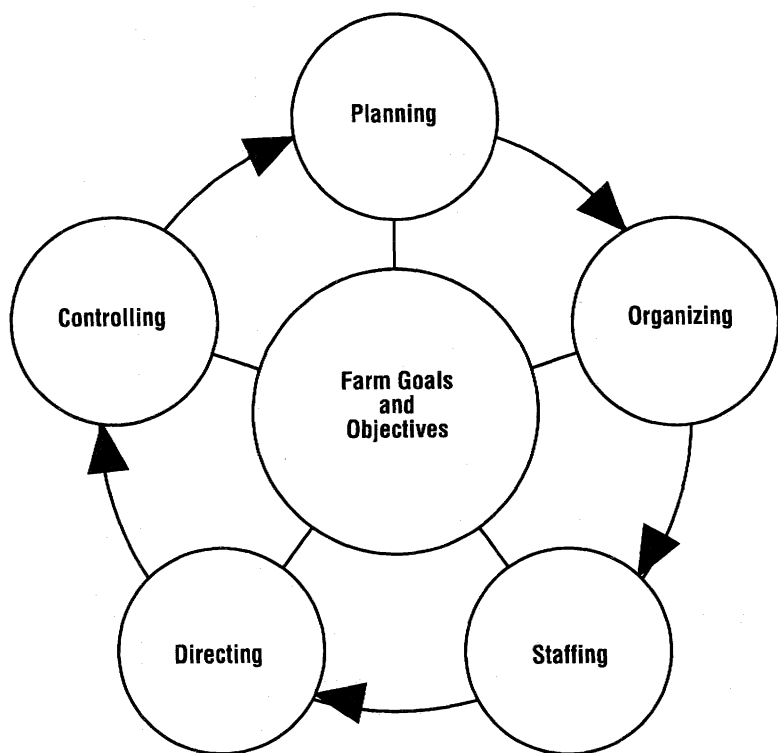
and production, maintenance of farm buildings and grounds, tradeoffs between capital appreciation and current earnings, long-term growth, and achievements must be established. While these goals and objectives are not always formalized in writing, they need to be thought out and discussed.

The figure suggests there are five basic management functions or activities used to achieve the goals and objectives of a business.

Planning. While all five of the basic functions are important, planning is crucial because a good plan involves all the other functions. Planning involves:

- Setting daily priorities and schedules: What should be included in today's "To Do" list? Who should complete each priority activity?
- Recognizing problem areas and looking for alternative solutions: Why did milk production drop last month? Did we have the protein level right in the feed? Was there a change in the quality of the forage we fed? Should I get a consultant to look at my ration balancing program?
- Making a financial plan and cash-flow statement for the year, knowing when and how much credit must be obtained and where the cash will come from to meet the regular obligations.
- Looking at alternative cropping plans for this year; examining Government programs to see whether a specific program, such as USDA's Conservation Reserve Program, is useful to the operation; working with USDA's Agricultural Stabilization and Conservation Service to know program yields and the current alternatives before signing up for programs or deciding to stay out.
- Establishing the overall enterprises for the business: Which fields will be planted in row crops this year? What

All Functions of Farm Management Work Toward Achieving Farm Goals and Objectives



cropping sequence will be used in the fields with the most erosive soils? Should part of the crop sales be contracted? Should the wheat be sold or stored after harvest?

- Developing the business: How fast should the business grow? Is new staff needed? What professional development is needed for each manager?

Planning cannot be done just once a year; it is an ongoing process. Plans get revised when established checks or measures determine that goals are not being attained. While some planning can be done while driving to town in

the pickup, most planning deserves undivided attention without interruptions. A well spent hour with a banker, with your computer, or in discussion with a trusted neighbor or your partner may save a lot of money, time, and energy later.

Organizing. Organizing is establishing an internal structure of the roles and activities required to meet the farm's goals. The manager must decide the positions to be filled and the duties, responsibilities, and authority attached to each. Organizing also includes the coordination of efforts among people.

Organizing includes:

- Deciding who reports to whom; this is often referred to as the chain of command.

- Determining the functions in each position (job design), including the degree of authority.

- Establishing the work routines and standard operating procedures for each production enterprise.

Staffing. Staffing is as crucial a management function to a small or part-time business as it is to a much larger one. Often, the need to figure out how to get all the jobs done on time is even more critical because there is so little flexibility in the labor supply. No business should try to operate without the possibility of hiring assistance when needed. Assistance can range from hiring a teenager after school to help with a few livestock operations to contracting with an accountant to prepare tax records. Staffing activities include:

- Recruiting and hiring workers. Whether a business needs one full-time worker, two or three part-time helpers on a regular basis, or hourly help for seasonal work, maintaining a competent labor force is essential. Labor management starts with obtaining qualified workers who understand what is expected of them. Written job descriptions may not be essential when there is only one employee other than the manager, but they can do no harm; often such descriptions ensure that the manager has thought through what is expected. Terms of compensation and benefits must be established, another reason for having something in writing.

- Training and evaluating workers. Managing a business means that someone takes responsibility for assigning tasks and making sure that workers understand how to do their jobs and

what is expected of them. It helps to have some incentives for high levels of achievement. Telling people when they did something well may be even more important than telling them when they did something wrong. Both are necessary. This is even more important when all the workers are family members.

Directing. Directing is closely related to staffing. The smaller the business, the more the two are interlocked. Delegation of authority is often one of the most difficult things for the manager of a small business to accomplish. All the workers need to know their responsibilities and have a sense of when they can make decisions and when the boss must be involved. If a milking cow is down, each employee should know whether or not he or she can call the vet. The larger the number of employees, the more crucial the lines of authority.

Motivation is part of directing. Knowing what is going on and listening to employee concerns help build communication and confidence. Creating a team spirit where every worker feels some responsibility for the success or failure of the operation is desirable. Openness and understanding by a manager are respected in close working relationships, and thus common on farms.

Controlling. Controlling is another key function. Control is the part of business management that determines that new methods are needed to turn out positive results when an investment decision is proven to be less profitable than planned. Control requires keeping track of expenses and income. It forces a manager to monitor what is happening every day; it is one of the good reasons to make the rounds of the fields in your pickup on a regular basis, to

look in on operations where you are not working.

Some of the important activities that are a part of controlling include:

- Monitoring the records and accounts of the operations. These records can always be kept by someone besides the manager, but the work must be done on a regular basis; and it is the manager who has to analyze these records to know what is going on.

- Comparing rates of production and levels of performance or productivity against established goals or generally accepted standards. Control ensures that these comparisons are made in a systematic manner and discussed with the people directly involved; problems in production arising from natural causes need to be recognized and allowed for in good management.

- Monitoring production processes and making changes as necessary. Adjusting when to plant, when to spray, when to pick, and when to start and stop harvest are all results of control. Keeping track of the work routines and making sure that plans are accomplished (or revised) will make a difference.

Making Management Work

Organizing and operating a farm business requires a manager to make and carry out a lot of decisions. Some decisions take time and study; others cannot wait until tomorrow. Part of the satisfaction of operating a farm business is seeing a major change in enterprises work better than expected, solving a livestock nutrition problem that was finally recognized, or knowing that you got started planting corn when field conditions were best. Good management allows the other farm resources to be used effectively. Understanding the functions of management is one step in becoming a better manager.

What Makes a Successful Farm Manager?

Unless you can judge success for yourself, success will be fickle and elusive. Real success depends on setting and achieving our goals. If we reach them, we can say we've succeeded, and we may set higher ones. When we don't reach some of our goals, we usually change them.

Effective farm managers don't just "go with the flow." They set goals. That's how they make a difference. That's how they get things done. Simply reacting to change won't do.

Our values, beliefs, upbringing, ethics, morality, and experience influence how we set our goals. So do our family and friends. Others often try to give us goals to strive for. For many, wealth is a way of "keeping score" in the success game.

But another person's view of success is always suspect. There are many gauges of success in life besides the financial measures so frequently associated with being a successful business manager.

Still the views of others can help us look objectively at our own accomplishments. Objectivity is important in es-

tablishing goals and setting priorities among sometimes conflicting goals. Objectivity can also help you recognize real success when it happens.

One must pursue success in life or business in a dynamic and always changing social, economic, and political environment. In fact without change, there would be no need for goal setting or good management and no call for problem definition or problem solving. The stresses of conflict in human relationships and in family or social responsibilities would not occur.

Five Motivating Objectives

People have broad objectives that usually include earning a good income; achieving security, including personal health and safety; personal growth and increased understanding; acceptance by others; and recognition as an individual. The first three—income, security, and growth—often have some economic value. The others may not. But they are still important.

We also have goals, by which I mean something relatively specific and having a time schedule for attainment.

Earl I. Fuller, Professor and Extension Economist-Farm Management, University of Minnesota, St. Paul, MN

Goals are stepping stones to broader objectives, and most goals contribute to more than one objective. However, setting goals requires making tradeoffs. For example, there is sometimes a trade-off between increasing income and maintaining financial security, or between increasing income and meeting family responsibilities. Individuals weigh the five objectives differently. If they did not, most of the conflicts between members of a farm management team or within a nuclear or extended farm family would cease to exist. Resolving these conflicts and the emotional stress they cause takes time, effort, and skill.

Acceptance and Recognition

We care what others think. We all want acceptance from people in the groups that we belong to—or aspire to belong to. We behave accordingly. We also seek and need recognition. To be recognized as a successful person by one's peers and colleagues is a major motivating force not only in the management team but also in the work team. No one wants to be chastised or shunned. Even those who say they don't care what other people think sometimes behave as if they do. We should recognize how our needs for acceptance and recognition influence the way we think and act.

If we are tossed about by the judgments of others, we cannot be effective managers. But if we are unaware of how others view us and our behavior, we cannot provide the necessary leadership to guide an organization or to attain the goals we have set for the organization or ourselves. If we set unrealistic goals—in view of the motivations and capabilities of those we work with—we may doom ourselves to failure. Goal setting requires realism. We need to be

able to express our goals and “sell” them to others. The success of the enterprise and of ourselves as managers depends on that ability.

Components of Success

A wide variety of management styles and attitudes can lead to management success. But there are some attributes that many effective managers share. It helps to have a positive, creative attitude that turns problems into opportunities. And it is important to set aside time to think and to manage. Being willing and able to delegate responsibility is a valuable trait. Other important elements include the ability to set specific, written goals, to make decisions based on those goals, and to modify decisions and goals as conditions change. It is also helpful to have a talent for, and skills in, communicating effectively with family members, colleagues, employees, and those in the business community.

There are strategies that can help a farm manager be more successful. One is to develop and regularly review a set of well specified goals. Written goals are easier to review and clarify when discussing them with family members, others in the management team, and lenders.

It is also important to have a clear understanding of risk and how to manage it. How much risk exposure is appropriate given your set of business and personal goals?

Keep an eye on what goes on beyond the farm fence. Farm businesses are part of a complex and dynamic world economy, and it is important to monitor national and international trends in order to avoid problems and identify opportunities.

Stress is a normal part of life—on the farm or off—but stress must be man-

aged in order for it to be a creative force and to avoid the difficulties of distress—which comes from too much financial or personal stress.

All managers have their limits. But the successful ones find ways to overcome them by building a management team of family members, colleagues, consultants, and others. The knowledge limitations of managing in a “post industrial era” and a “global village” are real. Success, in part, is a matter of getting others to “buy into” your agenda or business plan.

Image. To the realist, success is more than an image. It’s great to have the tallest silo, the biggest tractor, the most picturesque farm, or the highest yield. There is nothing wrong with striving for goals of this nature; they are not much different from the goals successful managers outside of agriculture strive for. Gaining acceptance and recognition in this manner is fine as long as you can afford it. Rising profits and net worth, and improved debt-to-asset ratios are not the sole measure of success. But when image goals come into conflict with effective management, an objective analyst would have to question them.

Risk Management

If risk taking is a normal part of business, so is risk management. (See Part II, Chapter 4 and Part III, Chapter 10 on risk management.) Buying an insurance policy against a potential financial disaster makes sense. If an entire farm enterprise could fail in the event of some disaster, it is worthwhile to buy insurance. However, self-insuring by investing in more farm equipment than you might ordinarily need may make sense in order to reduce the stress that would arise from having machinery break down as a result of overuse or

adverse weather conditions. Yet farmers make risky commitments at planting time when the eventual outcome is uncertain. A prudent manager sometimes takes a flyer even if the odds are against a payoff—if the potential gain seems worth the risk of a relatively small loss.

Successful business managers cannot be easily classified by their willingness to take risk or to insure against risk. Successful managers often have an intuitive sense of the odds. At times they seem to seek risk; at others they shy away. For many farm managers, the greater their net worth, the less motivation they have to accept risk and the more they are inclined to protect what they have.

Differences in attitude toward risk may lead to conflicts between different generations in a family partnership. The younger generation often has less concern about risk taking. They may have less to lose if a risky enterprise turns out poorly, and they may have substantial income needs that motivate them to “see what they can do.” However, the parents, approaching the end of their business years, are likely to question any business plan that exposes them to a potential loss in health or net worth. They are often willing to sacrifice current or future income in order to maintain their financial security and position.

New Technologies

Is always having the latest farm technology an indication of success? Not necessarily. Many farmers do adopt some new technologies the moment they are available. They are called “innovators.” Others wait until they learn something about how the technology works and whether it fits their situations. They are called “early adopters.” Many

successful farm managers are early adopters of some technologies—but few have all the newest technologies. Successful managers tend to set priorities for their time and other resources. This may lead them to reject new ways early on. It is simply not worth it to be on the “cutting edge” all the time, even if this means you sometimes fall into the late adopter category. The key is the economic adaptation to new technologies and periodic evaluation of the risk and potential payoffs of making a change. As the old saying goes, “Be not the first on which the new is tried nor the last to lay the old aside.”

Computers are becoming standard equipment on many farms, along with tractors and other more traditional farm machinery. In many intensively managed, high-technology farm businesses, a computer can make the manager’s job simpler and more manageable. But it is important to identify the computer system that best fits your needs. (See Part III for more information on using computers to improve farm management.)

The Financial Part of Success

Meeting financial objectives is only one aspect of success. But it is a necessary part of business survival. It is also the area that others tend to focus on. Some even view financial success as the “bottom line measure.” Achieving financial success means reaching some level of three conditions: controlling enough financial resources to operate a profitable business; having adequate financial security to survive inevitable economic adversity; and having the financial independence to maintain that control and security.

Financial success is usually measured in three ways: profitability, solvency, and liquidity. Profitability is the rate of

return to the resources owned and controlled during a given time period. Solvency is wealth accumulated as equity or net worth at specific points in time. Liquidity is the ability to meet financial obligations on time. All of these can be assessed by examining a farm’s financial statements. (See Part III for more information on financial statements, analysis, and planning.)

Types of Managers

A recent survey grouped farmers into five categories. “Innovators,” who were characterized as being business oriented in their approach to achieving financial success and managing debt, comprised 5 percent of respondents. Innovators regularly used financial planning and analysis tools. They managed debt as a business tool. They used consultants to augment their management teams and allow them more time to concentrate on management. The survey found that 21 percent of the innovators had specific written plans for their farm operations.

A second group, called “Gamblers,” seemed more willing to act on hunches and gut-level feelings. They were also willing to accept greater risk for the chance of “making it big.” On average, this approach didn’t appear to work out as well. Gamblers tend to be optimistic and seek recognition through visible growth in wealth, or recognition, or both. The reader is reminded of the earlier discussion on objectives and goals and when to gamble and when to insure.

The next group, known as “Ordinary Joes,” are what many would call production-oriented farmers. They seemed less concerned with marketing and finance and focused most of their attention on production and technology.

A group called the “Low Riders” were older on average than those in the other groups. Their debt was minimal, and security seemed more important than growth. The last group, the “Marginals,” were younger and heavily leveraged, perhaps not by choice. Stresses, financial and otherwise, were real. While they had less to lose, they could easily lose everything.

Real Success

As I have attempted to point out, success should be viewed from a broad perspective. There are a lot of ways to be and feel successful. While factors such

as societal expectations, family responsibilities, and financial resources may impose certain limits, success is still possible. But to achieve it, you have to define success for yourself, and you have to clarify and change your goals and objectives as time goes on. You have to make choices about what goals are most important to you and resolve conflicts about goals among family members and colleagues.

Characteristics of U.S. Farm Managers

Total farm management can be viewed as the "systems" approach to running a farm. It is a complete way to look at the farm operation. While effective and efficient farm management has always been important for farm families trying to meet their personal and business objectives, it is even more critical in these rapidly changing times.

What Is Farm Management?

Farm management can be defined as the coordination and supervision of a farm business in order to increase long-term profits or to achieve other specified goals. It can be viewed as a combination of production management, business management, financial management, marketing management, and personnel management.

There are many types of farm managers, and the farms they operate have different sizes, types, and organizational structures. Many farm managers depend heavily on off-farm work for part of their income.

Tenure Arrangements

Throughout our history, some farmers have operated their own farms while others have operated farms as part owners or tenants. While full owners own all of the land that they farm, part owners rent land in addition to the land they own (see table 1).

As of 1987, the majority (59.3 percent) of the country's 2,087,759 farmers were full owners and 88.5 percent were either full owners (1,238,547) or part owners (609,012). Those renting all of their land are classified as tenant farmers and numbered 240,200 and comprised 11.5 percent of the total. The full owners controlled 32.9 percent of the acreage while the part owners had 53.9 percent of the acreage for a total of 519,814,523 acres. Tenants operated 13.2 percent of all acres and they represented 11.5 percent of all farms.

The full owners, who control about 33 percent of all U.S. farmland, clearly have full management control. Part owners have a large measure of control

Robert A. Leuning, Professor Emeritus of Agricultural Economics, and Bruce L. Jones, Assistant Professor of Agricultural Economics, University of Wisconsin, Madison, WI

Table 1. Tenure Arrangements of Farm Operation

Tenure of operator	Farms	% total	Acres	% total
Full owner	1,238,547	59.3	317,787,149	32.9
Part owner	609,012	29.2	519,814,523	53.9
Tenant	240,200	11.5	126,868,953	13.2
Total	2,087,759	100.0	964,470,625	100.0

Source: 1987 Census of Agriculture

over about 54 percent of all farmland; their control is subject only to the terms and conditions of their contracts on the leased portion of the land. Tenant operators, who oversee about 11.5 percent of U.S. farms, also exercise significant control, even though some control is exercised by landlords. The vast majority of landlords are retired farmers or family members who inherited farms. At most, 40 percent of the farms have some management input from nonoperators—potentially affecting 67 percent of the acres. In practice, nonoperators probably exert little control over farm operations and have little involvement in farm management.

Type of Farm Organization

Of the 2,087,759 farms recorded in 1987, 86.6 percent are individually owned farms, comprising 65.1 percent

of the total farm acreage (see table 2). The next largest number of farms are organized as partnerships, comprising roughly 10 percent of all farms and 15.9 percent of total acreage. Family-held corporations comprise 2.9 percent of all farms and 11 percent of the acres, while corporations that are not family owned comprise .3 percent of all farms and 1.3 percent of the acres. Others types of farm owners—including cooperatives, estates, and trusts—comprise .6 percent of all farms and 6.7 percent of the acres.

The vast majority of farms are owned and controlled by individuals who have significant management control over their operations. As table 2 indicates, few farms are owned by someone other than farm families.

Table 2. Type of Farm Organization

Type of organization	Farms	%total	Acres	%total
Individual or Family	1,809,324	86.6	627,559,205	65.1
Partnership	199,559	9.6	153,283,239	15.9
Corp. - Family Held	60,771	2.9	105,946,304	11.0
Corp. - Other	6,198	0.3	13,429,082	1.3
Other - Coop, estate, trust, etc.	11,907	0.6	64,252,795	6.7
TOTALS	2,087,759	100.0	964,470,625	100.0

Source: 1987 Census of Agriculture

As farms grow, the basic “family” farm structure will remain essentially intact. However, farm managers are likely to adopt more complex organizational structures such as partnerships, leases, sharing arrangements, and corporations. This can facilitate the entry of beginning farmers into farming businesses and also help those who are leaving farming.

Off-Farm Work

Many farmers supplement their income with off-farm employment (see table 3). For many farm families, in fact, a large proportion of family income comes from off-farm sources.

In 1930, some 6.3 percent of farmers worked off the farm for 200 days or more; by 1987, the number of farmers who reported 200 or more days of off-farm employment rose to 37.6 percent. This shift clearly indicates that part-time farms are becoming the rule rather than the exception. Today, more than 60 percent of farm-family income comes from off-farm sources.

Farmers' Occupations

Not all farm operators view themselves primarily as farmers. Many have other principal occupations and think of farming as a sideline or avocation (see table 4).

Those whose primary occupation was farming managed about 62 percent of all farms and about 80 percent of the farm acreage. Hired managers operated only .8 percent of all farms but 5.9 percent of total farm acreage. The remaining acres are farmed by the 36.7 percent of farmers who do not consider themselves specialized farmers. They include landlords, hired managers, trustees, and part-time farmers.

Farmer operators have widely differing characteristics and organize their farms differently. An increasing number work off the farm and more than a third of them do not consider themselves specialized farmers. Clearly, further changes are on the way in farming and the rural community.

Table 3. Days of Off-Farm Employment

Number of days	Years				
	1930	1950	1969	1982	1987
None	69.6	61.1	45.7	42.1	43.1
Less than 100	18.7	15.5	14.4	10.9	10.2
100 - 199	5.2	5.8	8.1	9.2	9.1
200 or more	6.3	17.5	31.9	37.8	37.6

Source: U.S. Census data

Table 4. Occupational Specialty of Farm Operators

Occupational specialty	% of reporting farms	% of operated acres
Farming	62.5	80.6
Hired manager	0.8	5.9
Other	36.7	13.5

Source: Farm Operating and Financial Characteristics, 1986

Part II



Strategic Management:

How Farmers Make Decisions

About the Big Issues

Using Strategic Planning To Prepare for the Future

What separates a successful agribusiness firm from an unsuccessful one? Numerous factors—quality of the land, managerial skill, and sufficient equity capital—are all important. And yet, some firms that seem to have these basics are less successful than other firms that are not so well endowed.

An important attribute of good management is to be able to step away from the trees and be able to see the forest. Strategic planning is analyzing the forest—the business and the environment in which it operates—in order to create a broad plan for the future. Strategic planning may bring to mind images of corporate executives meeting at luxurious retreats and staff members preparing multicolored visuals and reams of statistical and financial data. The result may be a 2-inch thick document on the chief executive's bookshelf.

For smaller agribusinesses and farms, the most effective planning may take place at the kitchen table. To establish an appropriate atmosphere for strategic planning, it is important to set aside time away from the day-to-day problems and interruptions so that the key participants—owners, managers, fam-

ily members—can reach a common understanding about what they want to do in the next 3-5 years, and how they want to do it.

It is important that management takes a broad overview of the economy and the industry to determine the major opportunities and threats. Tactical planning is concerned with day-to-day and week-to-week decisions, such as what and how much pesticide to use, which cows to cull next, or whether to overhaul the old tractor or buy a new one. The results of strategic planning could lead to new enterprises, major capital investments, or perhaps even an exit from farming. This broader focus over a longer time distinguishes strategic planning from tactical planning.

Why Do Strategic Planning?

Strategic planning permits you to make more profits, in the long run, by:

- Establishing a clear direction for management and employees to follow,
- Defining in measurable terms what is most important for the firm,
- Anticipating problems and taking steps to eliminate them,

Gerald B. White, Associate Professor of Agricultural Economics,
Cornell University, Ithaca, NY

- Allocating resources (labor, machinery and equipment, buildings, and capital) more efficiently,
- Establishing a basis for evaluating the performance of management and key employees, and
- Providing a management framework which can be used to facilitate quick response to changed conditions, unplanned events, and deviations from plans.

Who Should Do Strategic Planning?

The planning should be initiated by the operator/manager of the agricultural business. In some cases, this process could involve a hired manager, but for most firms the operator/manager and other members of the family involved with management should be involved in the planning. In strategic planning, the process is as important as the final product. Getting the whole management team involved is critical. Strategic planning with typically close-knit farm families cannot be done in isolation from other family members, particularly when goals are set for the business. In such operations, business and family considerations are often so interwoven that it becomes artificial to try to separate the two. (See Part II, Chapter 3 on managing family and business conflicts.)

Steps in Strategic Planning

Strategic planning involves the first seven steps shown in figure 1; an eighth step—implementation—is strategic management. This chapter focuses on the seven steps in the planning process.

Step 1. Define the Firm's Mission.

The mission statement defines the purposes of the firm and answers the question, "What business or businesses are we in?" Defining the firm's mission

forces the operator/manager to carefully identify the products, enterprises, and/or services toward which the firm's production is oriented. This statement answers the question, what is our current situation?

- What markets are likely to produce the best opportunities?
- What type of agricultural commodities or services can we produce to take advantage of these opportunities?
- What, if any, other activities are we involved in, and what are the priorities of these activities?

Establishing strategic goals, however, is the key element of the mission statement.

- Why are we in business?
- For profits?
- To provide employment/security for other family members?
- To increase wealth?
- To gain community status?

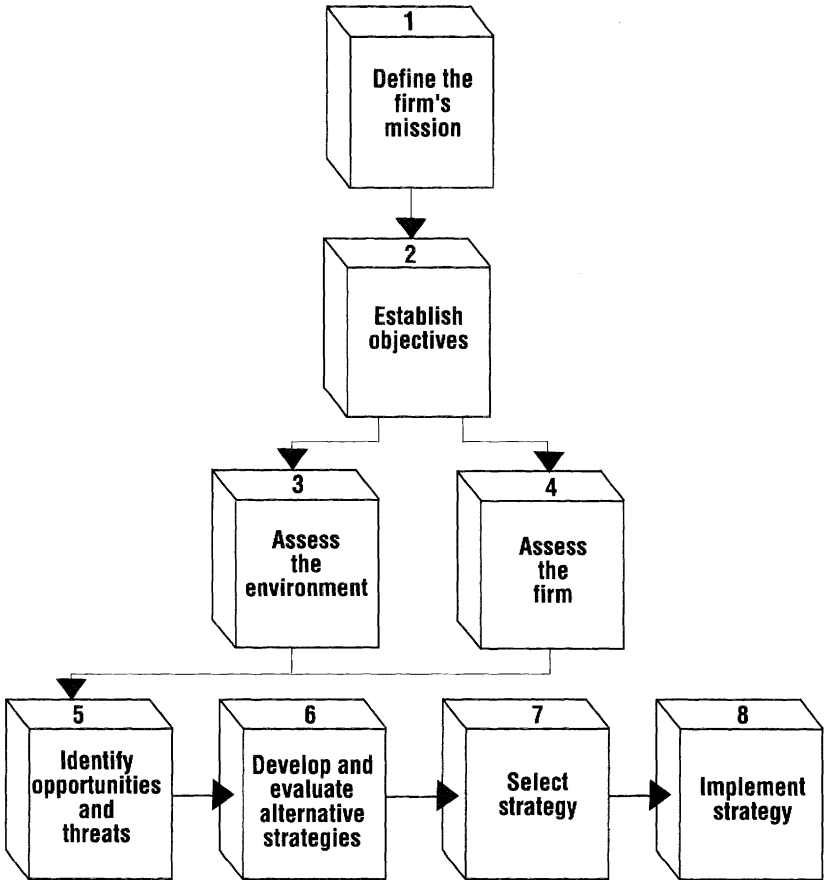
Answering these questions will suggest goals that will help to clarify objectives in the next step.

A mission statement is not necessarily a long document. In fact, it should contain fewer than 100 words, and two or three sentences may be sufficient.

Here is an example of a mission statement:

We operate a 70-cow dairy farm to support a modest level of living for two families. Our goals are to (1) build net worth, (2) stay in farming if at all possible, (3) gainfully employ two full-time family members (partners), (4) provide a good environment in which to raise our children, and (5) allow each partner suitable time off to enjoy family living, community activities, and hobbies. We would like to provide for the transfer of the farm to (partner) and to provide retirement income to (partner) within 5 years.

Figure 1. The Strategic Management Process



Step 2. Establish Objectives. Goals, which are the more general, long-term desires of operator/managers, clarify the firm's purpose. Objectives should translate the mission into concrete terms. Objectives should be quantifiable and straightforward statements such as the following: increase sales by 100 percent over the next 5 years, reduce labor costs by 25 percent in the next 3 years, increase production per acre of grapes by 30 percent in the next 5 years, and

provide health insurance coverage and Social Security coverage for two family employees next year. These objectives should be chosen in such a way that they contribute to attainment of the goals identified in Step 1. Each objective has two characteristics: (1) it can be measured, and (2) there is a given time in which to accomplish it. This allows management to evaluate progress in implementing the plan.



Strategic planning is as important to the family farmer who plans over the kitchen table as it is in the board rooms of large corporate farms. (USDA photo, 0986 X1092-10)

Step 3. Assess the External Environment. Every agricultural firm faces uncertainties, threats, and opportunities that are beyond its control. Market forces may cause prices to plunge, either in the long-run or short-run. Large crops, declining consumer demand, a strong dollar, high interest rates, changing Government policies, and regulation of labor and pesticides are external threats that can cut profits or make business more difficult. New market opportunities are created by demographic changes, changing consumer lifestyles, population growth in selected regions, and technological breakthroughs.

It is important in this step that the operator/manager understand the economic, social, and technological forces that will affect the firm. Then reasonable expectations may be formulated about what will happen to product prices, interest rates, the rate of inflation, labor markets, and input prices over the next 3-5 years.

Step 4. Assess the Firm's Strengths and Weaknesses. The quality and quantity of resources within the control of the operator/manager is the first part of this assessment. What are the abilities and limitations of the operator/manager? What skills and abilities do the employees have? How modern and efficient is the physical plant? How large is the resource base? What are the soils on the farm? What is the cash position of the firm? It is important that these resources be compared against those of competitors. Many farms have an unrealistic view of their own resources and operation because they do not compare themselves to others in the same business. The process of providing candid answers to these questions forces the operator/manager to recognize that every firm is constrained in some way by the internal environment—its physical resources as well as its human skills and abilities.

Step 5. Identify Opportunities and Threats. Combine the data gathered in Steps 3 and 4 to determine the threats and opportunities the firm might encounter in the planning period. Difficulties in the external environment can present opportunities in another segment of agriculture. For example, concern about cholesterol in meat products has created new markets for poultry and fish products. Concern about carcinogens in the environment, including some pesticides, has brought about new opportunities for cruciferous crops. Consumers are rediscovering oatmeal. Some firms have avoided problems by creatively turning an external threat into an opportunity. For example, Monfort of Colorado, a large feedlot operation, developed leaner and less costly cuts of meat packaged for microwave cooking. Promotional efforts were aimed at younger, more health-conscious consumers and two-career couples.

Step 6. Develop and Evaluate Alternative Strategies. Step 6, along with Step 7, is at the heart of the strategic planning process. This is the point at which the firm develops the alternative plans that describe the methods for attaining objectives and obtaining greater long-run profits.

In what ways can production agriculture firms gain a competitive advantage?

The answer to this question depends to a great extent on whether or not the farmer is a price-taker. Farmers are traditionally price-takers. An individual farmer has little, if any, power in the market to influence the price of commodities such as milk, grain, eggs, grapes, and potatoes because there is a very large number of producers and a homogeneous product is produced. Each quart of milk, bushel of grain, or dozen eggs is very similar to that produced by

thousands of other farmers. These farmers have no "market power" because buyers can obtain the commodity at a price dictated by supply and demand considerations, after adjusting for transportation costs. High cost regions or firms are at a distinct disadvantage in these markets.

Some agricultural firms, such as landscape contractors or small wineries selling premium wines, are in less competitive markets where there are only a few smaller firms in the surrounding area and products or services can be differentiated. While these producers are also conscious of their competitors' prices, there is no clear "market price" for each product or service. In less competitive markets, the operator/manager is faced with the problem of pricing his or her product.

What types of strategies can operator/managers in price-taking firms employ to attain a competitive advantage?

1. *Become More Efficient.* Increase profits by:

- Reducing input use, holding product and price (quality) constant,
- Using more, or higher quality, inputs, increasing revenue more than costs.

2. *Seek Out Alternative Enterprises.*

3. *Exploit Quality Differences.* Obtain price premiums for quality that more than offset the additional costs involved in producing higher quality commodities.

4. *Integrate Horizontally.* Farm more units, or add enterprises, enlarge enterprises to gain more complete use of existing unused resources; acquire additional resources. Spread fixed costs over more units of output.

5. *Integrate Vertically.* Obtain more profit by moving higher or lower into the marketing and distribution chan-

nels—add storage or packing facilities, trucks to haul products, and direct marketing; acquire resources to produce inputs that formerly were purchased.

6. *Reduce Risks Through Diversification and Hedging.*

7. *Identify New Markets.*

Firms that have some degree of control in the market, because there are fewer competitors or because there is the possibility for differentiation of products and services, have the potential for additional strategies to gain a competitive advantage, including these:

A *differentiation strategy* emphasizes high quality, excellent service, innovative design of products or services, or an unusually positive brand image. The key element in this strategy is that the attribute to be emphasized must be different from those offered by rival firms; in addition, the differences must be significant enough so that the price premium exceeds the additional cost of differentiating. The Monfort emphasis on leaner cuts of beef is one such successful strategy. Ben and Jerry's ice cream is another. (See the 1988 Yearbook of Agriculture, *Marketing U.S. Agriculture*, for more information on innovative marketing strategies.)

A *focus strategy* aims at a cost advantage or differentiation by focusing on a narrow segment of the market—a niche. In this strategy, the operator/manager selects a segment or group of segments (such as product variety, type of end buyer, distribution channel, or geographic location of buyer) for which to tailor a product or service and excludes other markets. The goal is to exploit a narrow segment of the market. Again, the feasibility of this strategy depends upon the size of the segment and whether or not it can support the additional cost of focusing.

Swedish Hill Vineyard and Winery of Romulus, NY, has successfully used a focus strategy. The owners, Dick and Cynthia Peterson, have established an image with the Scandinavian community in Upstate New York by holding an annual Scandinavian Festival that features food and entertainment that appeal to people of Swedish, Danish, Norwegian, and Finnish descent. To reinforce this image, the Petersons have developed two wine labels, Svenska Blush and Svenska White. Even though none of the Scandinavian countries has a significant wine industry, identification with the ethnic group has been an important part of Swedish Hill's recent growth in sales. Swedish Hill is presently negotiating a contract with the alcoholic beverage control agency in Sweden for exporting to that country.

Farmers who are price takers do not have the options for employing such strategies as differentiation and focusing. Of course, the option remains for price takers to move into new areas or businesses where they have more control over prices and more market power. Operator/managers who consider this option, however, should be forewarned that it is very easy to underestimate the difficulty or cost in attaining additional market power.

It is possible that no identified alternatives will permit a particular farm family to attain its objectives; therefore, nonfarming alternatives may need consideration. It may be possible, for example, to sell some farm assets, keeping part or all of the land and residence, and to seek off-farm employment. Nonfarming alternatives should not be neglected in selecting alternatives.

Once alternatives are developed, Step 6 is only half completed. These alternative strategies must be evaluated. In

practice, management may come up with a long list of possible alternatives. These can usually be whittled down with reasoning and logic. Once the obvious losers are eliminated, “pencil-pushing” is in order. There is no single or preferred method for evaluating alternatives, but some combination of the following may be used:

1. Budgeting alternatives—both profitability and cash flow.
 - Enterprise
 - Whole farm
 - Nonfarm alternatives
2. Break-even analysis.
3. Projections of income, cash flow, and balance sheet statements.
4. Computerized decision aids.

(See Part III for more information on budgeting, financial analysis, record-keeping, and computerized systems that assist in farm management.)

Step 7. Select a Strategy. From the analysis in Step 6, the firm selects a strategy (an alternative or a combination of alternatives) that will enable the operator/manager to achieve the desired objectives. After evaluating alternatives, it may be discovered that the original objectives are not feasible. Therefore, the operator/manager may have to move back to Step 2 and select new objectives or reformulate combinations of alternatives. Selection of a final strategy may involve tradeoffs among goals. An alternative is seldom likely to be superior to all other alternatives for attainment of each of the goals of the operator/manager and his or her family. In this sense, the process of strategic planning should be recognized more as an art than a science.

Step 8. Implementation. The emphasis here has been on planning; however, the eighth step—implementation—is a crucial link in the strategic management chain. It is essential that

management periodically looks back on the plan and assesses how well the firm is doing toward reaching its objectives. Assessing implementation will point to mid-course corrections. Assessment enables planners to better understand the planning process. Perhaps objectives were set too optimistically or perhaps critical threats or opportunities were not recognized. Recognizing and correcting the plan’s weaknesses will improve strategic planning the next time the process is undertaken.

Looking Ahead

Strategic planning should not be viewed as a formidable task resulting in detailed plans. It should be written, but a few pages will suffice. The process should include all the key players participating in the strategic management discussion. It is essential that all individuals involved in managing the farm or ranch understand where the firm is going, how it plans to get there, and what problems or opportunities lie ahead.

Setting Goals To Guide Management Decisions

Goals! Goals! Goals! Almost everyone is enthusiastic about goals. Most people like to discuss goals; some boast of having goals. If you ask a friend or business associate about goals, almost certainly you'll get an affirmative response—one that implies goals are definitively known and are important. You also may receive a spontaneous goal attainment report. If so, it's likely to be an exultant report of goals that have been attained and a progress report on those where attainment still lies in the future.

People who teach management also attest to the importance of goals. Listen to almost any management guru, and you'll hear ideas like these:

- Identify your goals. Manage to attain them.
- Management is goal-directed.
- Take charge of your life and work—set goals and attain them.
- Without goals, you can't be a manager because you won't know what you want to achieve through your management decisions.

Virtually everyone agrees on the importance of goals. Most find satisfac-

tion in asserting that they have goals, and in declaring that they use goals as guides for their management decisions. Without doubt, goals are important.

The Goals Paradox

Despite almost universal recognition that goals are important, few people have written records of their goals. If you ask a farmer, a rancher, a fruit producer, an extension economist, or a chance acquaintance for a list of goals, you're likely to get a guarded response. That response—polite or not—will imply that your request is not really appropriate.

If you insist, you may receive a "goals list," but it's likely to have only nebulous or simplistic entries. Some entries may be both nebulous and simplistic. Indefinite statements of desired results ("to make a profit") or short-term task goals ("to finish harvest by November 1") are typical entries in a "goals list" produced in response to an insistent request.

Not everyone will respond with nebulous and simplistic goals. A small proportion of people you might ask for a

Paul H. Gessaman, Extension Agricultural Finance Economist and Professor of Agricultural Economics, University of Nebraska, Lincoln, NE

“goals list” will have carefully identified goals that have been written down. These people may or may not want to share their goals with you. As personal statements, goals may be too private to release for public examination.

Most people with a goals list identify only business goals. It’s rare to find people with written goals for their personal and family life. Their actions with respect to family, friends, and organizations indicate definite commitments to these personal and family life involvements. However, their visions of desired outcomes for these aspects of life are usually intangibles—mental constructs—not coherently written goal statements.

The paradox of goals is this: Many people will publicly affirm that they have identified their goals—and that goals are important. But, most cannot or will not record and communicate their vision of desired outcomes in the form of a goal statement that can be communicated to others and used to guide their management decisions.

Why the Paradox?

The paradox that there are many “goal talkers” but few “goal writers” is an intriguing aspect of human behavior. We know very little about why some people identify goals and many others do not. Perhaps differing expectations among those associated with a farm or other business cause them to avoid identifying goals. We do know that many people who verbalize the importance of goals—goal talkers—do not invest time and effort in systematic goal identification. Perhaps they do not recognize that clearly identifying goals can help them increase their management capability, personal satisfaction, and quality of life.

Identifying Goals

For many years, management workshop instructors have encouraged clients to put their goals in writing. For many participants, quickly developing a vision of the near and distant future to which they are willing to commit themselves seems as difficult as developing in 5 minutes an answer to the question, “What is the meaning of life?” When participants are unable to respond, the instructor often assumes that profit maximization is the principal goal of all participants and continues with the workshop.

This approach—which assumes that more profits will ensure the outcomes the participants seek in life—generally does not work very well. Even casual observation of human behavior indicates there is more to life than maximizing profits. Profits can’t be ignored—they are vital to continuation of a business—but managers have goals for their personal and family lives, as well as for their businesses. The complex, often conflicting, demands of family and business goals can limit a manager’s desire and ability to maximize profits.

For every manager and every business, the ultimate question is, “What am I managing to attain?” If goals have been identified that adequately describe desired conditions and outcomes, the obvious answer is: “Manage to attain goals.” Thus, the quality of goal identification is a primary determinant of management effectiveness.

In several States, purposive goal identification has been included in financial management education programs during the past 4 years. Individuals, families, and business associates involved in farm operations have had the opportunity to identify family and production unit goals. They usually have been

successful and committed to goal attainment when they have taken active roles in goal identification and when the privacy of each group has been maintained. Participants in most of the management units identified goals and used them to guide management decisions. Participants reported these positive outcomes from the experience:

- Communication among family members improved.
- Management decisions and work activities were more effectively focused on priority concerns; management effectiveness increased.
- Cash-flow management in the production unit and household improved as impulse buying of production inputs and household items was reduced.
- Borrowing, risk, and interest expense were reduced.
- Conflict was reduced, and working relationships improved.
- Expenses were kept under control, and profits increased.
- Anxiety and concern over the present and future were reduced.
- There was a better balance between production activities and family life.

The communication, negotiation, and compromise required for goal identification yield additional important benefits. When goals are selected in a way that ensures that each person does work that he or she enjoys, motivation increases and management performance improves. Perceptions of reality are modified as participants gain a greater understanding of each other's roles, interests, and activities. Identifying goals has both immediate and long-term payoffs—the quality of daily management outcomes and the focus of long-term decisions are improved.

Goals Change

Goals are personal descriptions of conditions and outcomes to be attained. They originate in response to fundamental questions:

- What do I (we) really want in life?
- What can I (we) do that will be most productive and worthwhile?
- What am I (are we) really trying to achieve by investing time, effort, money, and management skills?
- When will I (we) be able to attain life conditions and outcomes that are most important and worthwhile?
- What is the appropriate balance between personal (family) claims and production unit claims on time and resources?

As implied by these questions, identifying goals is a dynamic activity. Responses to the fundamental questions of life—and the goals of each family and management unit—evolve over time. The social and economic context of agricultural production changes, and the life cycle of each generation moves ahead. Periodic updates are vitally important.

In updating goals, as in initial goal identification, it's important to understand the current thinking of each person in the family or management unit. Current interests and motivations can be expressed, appropriate goals identified, and effective management ensured through systematic self-examination, discussion, creative thinking, negotiation, and compromise.

Does It Work?

Production activities in agricultural units—especially in large multi-enterprise units where two or more families participate—present formidable chal-

lenges. With a few people providing the labor, management, and capital inputs for complex farm production and marketing processes, it's easy for daily work activity to consume all available time and energy.

When this happens, the quality of daily decisionmaking may decline and longer-term planning and coordinating functions may be neglected. Periodic appraisals and purposive decisions about the whats, wheres, whens, and hows of the farm operation and family can be endlessly deferred. When this happens, it's easy for small problems to snowball into major disasters.

It's not easy to invest the time and effort that's required to keep management decisionmaking current and appropriate. Livestock must be cared for, crop production sustained, machinery and physical facilities maintained, inputs purchased, products marketed, and myriad other activities must be carried out. In the midst of this plethora of work and management responsibilities, cherished family life privileges and responsibilities must be fulfilled.

The results of systematically identifying goals are specific to each farm operation and too varied and complex to summarize. But the experiences of three Nebraska farm families illustrate several of the effects of purposeful goal identification:

Increased Communication and Mutual Support. A middle-aged couple and their two adult sons who operated a farm together enrolled in a series of four financial management workshops. A year later, the father recalled the experience:

Mom and I had assumed for several years that we and the boys really were headed in different directions. It seemed like they were against everything we

wanted to do, and when they made a suggestion, we sort'a automatically said, "No." Then we enrolled in your workshops.

I went to the first workshop to do financial analysis, and you said we were going to use part of the first day to work on goals. I almost got in the car and went home. When I found out that you were going to have us do more with goals in the second workshop, I didn't want to go back, but my wife talked me into it.

The same thing happened after the second workshop, except I started listening to what the boys were saying. It ended up that we learned some things from the financial analysis, but the main thing we learned was that the boys wanted the same things from the farm that we did. We quit fighting. Around our place, it's been the quietest summer for a long time.

Improved Balance in Life. The experience of parents in another multi-family farm operation had a humorous outcome. This family-operated farm was moderately large, complex, and very well managed. The early middle-aged parents, two sons, and a daughter-in-law ran the operation. In the four-workshop sequence, all five adults came to the first and second workshops. When the third workshop started, only the sons were present. When asked about the parents' absence, they responded with this story:

Mom and Dad are in Hawaii. When we identified goals in last week's workshop, we discovered that both parents had written down a goal of taking a vacation. And each of us had written down as a goal that they should take a vacation. After the workshop, Mom told Dad, "We've been married 28 years and never taken a vacation. Let's go to

Hawaii.” So they called for reservations. Now they’re in Hawaii, and for the first time we’re the only ones on the farm.

Action Taken. The parents in this family were in their late 30’s when they enrolled in a series of goal-identification workshops. They had two small children at home and a teenager about to leave for college. They had rented their present farm throughout their 18-year marriage. They said their delay in purchasing a farm was due to their own lack of resolve.

Six months after the workshops, they called for assistance in projecting cash-flows if they purchased a farm adjacent to their present rented land. They commented on the decision to purchase:

When we worked our way through the goal identification, we discovered that we really were committed to purchasing a farm. Previously, it had seemed like a wish-list dream. Now it’s a real goal, and we’re going to buy if

the numbers come out looking okay.

The numbers did look okay, they made the purchase, and now they are up-to-date on their payments and have a substantial financial reserve and an excellent credit rating. Goals they believe in and commitment to action guide their management.

Goals and Commitment

Goals and commitment—this is a combination that can’t be beaten. It is a combination that helps to ensure that this family and others like them will stay among the ranks of Nebraska’s farm owner-operators. With their contemporaries across the Nation, they form the backbone of modern agricultural production.

Managing Family and Business Conflicts

A Conflict Scenario

Paul and Sarah Cochran farm 1,500 acres and finish hogs on their farm. They've worked hard to free themselves of debt and feel confident about the stability of their business. But now they face a major problem. Their youngest child, Susan—recently graduated from college and married—wants to form a partnership with them. Paul wants to borrow money, expand the acreage, and add a large farrow-to-finish hog facility. He would bring Susan and her husband in as junior partners. He even spoke with an attorney about the idea.

However, Sarah objects. She is pleased that Susan is ready to go out on her own, but she thinks Susan and her husband should start independently—as she and Paul did—farming and working odd jobs to get started. Now that the farm is debt free, she sees no need to go heavily into debt again. She knows hogs are an around-the-clock responsibility. She loves their children as much as Paul does, but she is not interested in building the Cochran farm into a Little Southfork.

Becoming a Conflict Negotiator

To be a good negotiator you must begin with a perspective on management styles which influence the way you approach others in a conflict. Conflict negotiators often use the following principles for negotiation:

- Focus on unacceptable behavior, not on “bad” attitudes. You cannot negotiate attitude change, but you can negotiate behavior change.
- Try to fully understand your adversaries' attitudes and values, because attitudes support behavior.
- Demonstrate respect for the attitudes, values, and feelings of everyone in the conflict—even if you do not agree with them.
- Negotiate behavior change first; do not demand changes in attitudes or values.
- Listen and ask questions. Be open to new ideas, remain flexible, and keep talking, keep talking, keep talking.
- If the dispute escalates, call in a mediator or counselor to act as referee.

Jerry W. Robinson, Jr., Professor of Sociology and Rural Sociology, University of Illinois, Urbana-Champaign, Urbana, IL

These basic principles of conflict management assume that adversaries in a dispute are more likely to support solutions which they help develop.

Direct and Indirect Persuasion

Direct and indirect persuasion can be used when conflicts require negotiation. The differences between direct and indirect persuasion follow:

Direct persuasion	Indirect persuasion
Self centered	Other centered
Power focused	Process focused
Telling behavior	Questioning and listening behavior
Value centered	Idea and behavior centered
Solutions given or imposed	Solutions developed
You responsible for success	Others responsible for success

Typically, indirect persuasion is more effective in settling disputes, as indirect persuasion shifts the focus from the issues of the conflict to focus on the communication process—the way adversaries discuss and manage the dispute. Every member of the farm family team has duties and responsibilities. Every family member must help develop a solution if a dispute arises.

There are six steps or techniques for managing a family/business dispute: (1) initiate dialogue, (2) involve everyone in the dialogue, (3) assimilate information about the conflict, (4) reinforce agreements, (5) negotiate disagreements, and (6) solidify agreements.

Initiate Dialogue. Initiate conversation objectively. Call the family together and establish the fact that you will be open, honest, and attentive to every-

one's needs in what is likely to be a sensitive situation. Begin by developing ground rules for the communication session, and seek the group's consensus. A good set of communication ground rules should include six basic rules:

1. Everyone has the right to talk, to express his or her feelings, to be heard—and not to be interrupted.

2. Repeat what you heard a person say before you express your opinion about the issue. Ask people what they heard you say to be sure they were listening.

3. Agree to discuss one problem at a time. Too many issues confuse and stall negotiations.

4. Discuss present problems only. You have no control over the past, and previous problems often stall negotiations.

5. Use common courtesy—no name calling, yelling, or cursing allowed.

6. Everyone agrees to follow the ground rules. Point out that it is important to understand every person's position.

It may be helpful for you to point out that you are trying to be a conversation referee. Most people are familiar with the role of a referee in sporting events. The referee must be fair and objective, and insist that everyone plays by the rules. If you are in charge of the discussion, point out to the group that this is the role you want to follow, too.

Ask, "What's the problem?" and listen. Assure the person by your behavior that you care. Be gentle and demonstrate concern for the other person's position. This arouses everyone's interest because you will listen to their position, and they will be heard even though they may not agree with each other. If it is an intense dispute, ask that all parties talk through you and not to each other. This will help you con-

trol the communication process at the first stages. However, you are not to control the outcome.

Being courteous to everyone builds trust. Be flexible and open to suggestions and ideas from all family members as you initiate dialogue. Ask everyone to communicate concern for adversaries by listening and by using nonjudgmental behavior. Everyone should have respect for others and be responsible for his or her own feelings, perceptions, and actions. No one has to lose patience or temper—even in conflict.

Involve All Parties. The second phase of indirect persuasion is to involve all parties in the communication process. Involvement continues through all phases of conflict management discussion. (The Cochran family needs several family meetings with everyone participating in open and fair discussion.) Involvement begins by asking questions and encouraging others to answer. Listen as people respond to your questions. Seek the opinions, feelings, suggestions, and input of all adversaries. Indirect persuasion assumes that people support what they help create. Encourage members of the family team to help work out lasting solutions, and use involvement to get ideas and support for agreement on what the issues of the conflict are.

Develop empathy by listening for (1) the message content—what facts are stated? How do they relate to the conflict? (2) the feelings that underscore the message—is the person angry, frustrated, or sad? and (3) the values that influence the person's perception of facts and behavior in the conflict.

Good conflict managers ask probing questions in a nonthreatening way. Questions help you discover the interests, concerns, knowledge, skills, and

goals of others. By listening carefully, a skilled questioner can control or navigate the course of a conversation, even though others may be doing most of the talking. Asking questions allows you to explore alternatives with the other party in the conflict. You can gently force another person to consider an idea or option they have not considered by asking them questions about that idea. (For example, you might ask Sarah Cochran, "How did you feel about your husband's behavior when he spoke with an attorney before discussing the idea of a farm partnership with you?" and "What caused you to feel that way?" These are nonthreatening questions which yield information on a sensitive subject.)

Accept the credibility of others' feelings. Feelings about the conflict are real. Information may not be—it can be imagined. Many times those involved in a conflict have a right to be mad, frustrated, or disappointed. Explore—probe gently about what causes feelings. How and why did they develop? Encourage involvement.

Assimilate Information. The third phase of conflict management is to assimilate all this information. Develop a system for structuring and organizing all of the messages communicated. Everyone must consider all the feelings and the facts—both are important to manage conflict. Family members may not understand their major agreements and disagreements. Clarify every position expressed and its cause. Strive to get everyone to simply understand what is happening—what is causing the conflict. You are not negotiating; at least, not yet.

Assimilating is difficult because (1) adversaries tend not to listen to each other when they argue; they may agree, but they may not hear facts and feeling

messages from each other; (2) adversaries lack the courage to confront some of the reasons for disagreements, and they do not want to look stupid or evil; and (3) adversaries must work together during assimilation, but they may not want to because they would rather fight.

Make a large worksheet similar to figure 1. During assimilating, use information discussed and get everyone to help you develop the information to be placed on the worksheet. When you finish writing an agreement or disagreement on the worksheet ask, “Is this correct? Did I get it right? Is this what you said? Are these your true feelings?” The family can practice working together while they help each other pick the facts of the conflict apart.

Reinforce Agreements. The fourth step of the indirect persuasion approach to conflict management is to reinforce agreements. Always reinforce agreements before you negotiate disagreements. Naturally, adversaries want to maximize differences, and that is where they will try to focus your attention, but effective negotiators emphasize agreements and use behavior to reinforce. This process builds trust and understanding and makes negotiating easier.

People who disagree with one another and experience conflict frequently share more common goals and values than differences. During the early stages of conflict communications, help everyone discover and highlight agreements

**Figure 1. Assimilating Information About Conflicts:
A Sample Worksheet**

Feelings	Facts
Party A and B	Party A and B
Agreements	
Disagreements	

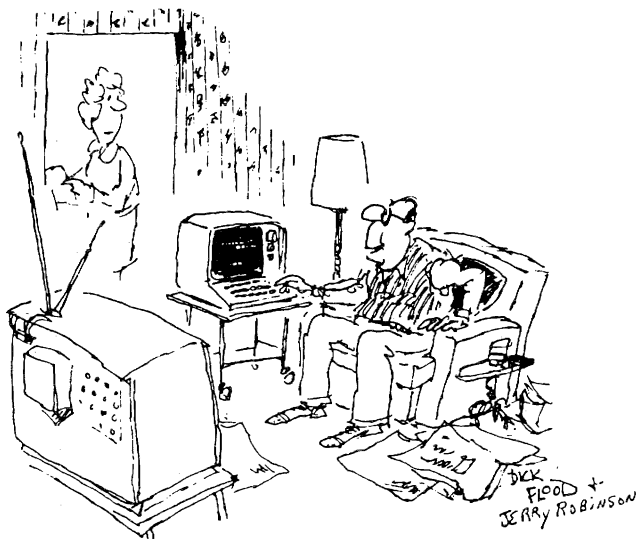
which are relevant to the argument. (The Cochrans probably could agree to keeping the farm together and in the family, preserving land for the future, or making a profit.) All these agreements need to be reinforced. Reinforcing agreements is a powerful psychological tool. Use it. Reinforcement techniques encourage an adversary to be rational and intelligent enough to propose tentative solutions in the next step.

Negotiate Disagreements. Now the adversaries are ready to negotiate disagreements. Adversaries usually want to begin negotiating disagreements long before they are ready. You may have difficulty getting them to slow down and tell you their feelings and the facts. Remind them that you cannot help negotiate disagreements until the facts and feelings are understood by everyone. Rarely is anyone 100 percent right and another 100 percent wrong. All probably have sincere concerns and legitimate goals which need to be discussed.

Negotiating disagreements begins by reviewing and ranking the disagreements listed in the previous step, reinforcing agreements. When issues are ranked, seek adjustments from each adversary with the most insignificant or easiest problem first. This helps to build a success backlog. For example, you might ask: "What adjustments are you willing to make?" or "What do you want to do? If your adversary will change, what changes will you make?"

Use the following behavior techniques to temper parties discussing disagreements:

1. Listen for all disagreements; is it a feeling, policy, or goal?
2. Communicate understanding for everyone's position; say, "That's one opinion," or "I understand your point of view."
3. Restate objections as fair or open questions so the parties will explore all the issues, then ask, "What solutions will you accept to this problem?"



"According to the computer, it's your turn to milk the cows."

4. Encourage adversaries to agree on the issue they are discussing.

5. Present evidence in a logical, nonthreatening manner.

6. Personalize benefits to adversaries for changing or adopting a suggestion; cite specific benefits they mention.

7. Do not rush responses; present the case, then give people time to respond.

8. Be realistic; expect results, but don't demand them.

9. Do not embarrass anyone; people do not enjoy being made to look foolish or inconsiderate, especially in a group setting.

10. Do not give up too easily; wait, then try again . . . and again.

If you are having difficulty, try not to make any threats—and try to keep adversaries from making threats. The only appropriate threats are issued when ground rules are violated. Threats should always be announced in advance. Never make a threat unless you intend to follow through.

Solidify Agreements. The last step in conflict management is to solidify agreements and confirm solutions to the problem. Compromises are detailed. This process is difficult if you have rushed through earlier stages. But if you have been thorough, this last stage might take little time and effort.

Begin by reviewing the changes agreed to and ask if compromises are still okay. Compromises should be discussed and debated again, if necessary. If an adjustment (change in behavior or policy) cannot be reached, shelve the issue and move on. When all issues have been discussed, review suggested compromises one more time. Then write a "contract summary." It helps to actually write out agreements and specific adjustments in precise terms. Review proposed actions carefully. This helps everyone check for accuracy of infor-

mation, perceptions, and expectations. Writing out contracts might seem unnecessary, but written feedback is the surest way to be certain everyone understands the agreement. Writing proposed adjustments or repeating them is a review that gives everyone time to think and suggest additional changes. It is better to discuss a misunderstanding now than later.

When the adjustments have been reviewed, specified, and checked for accuracy, confirm the areas of agreement. Commitment to the adjustment can be confirmed through formal or informal contracts, a checklist, handshake, or even a hug.

Successful Conflict Management

Success in almost every endeavor is the result of hard work, and that is especially true in learning conflict management skills. My ideal conflict management training workshop is 2½ days long; and even then, some folks are not very good at it. If you internalize the goal of becoming a better manager of conflict, you have begun the learning process. To be successful, focus on your behavior—not on the behavior of others. Become more attentive to the feelings and values of others. Learn to ask questions in a nonthreatening way.

Use feedback to tell others what you hear them say. When you have major disagreements say, "I have a different opinion. Would you like to hear it?" If the answer is "yes," give it honestly, fairly, and objectively. If "no," wait for a later time and try again. Focus on your behavior as a family communicator; set some specific areas where you can improve. Read some good books on interpersonal communication and conflict management.

Memorize the six indirect persuasion steps and learn the rules of thumb for negotiating disagreements. Then try to use them. Behavior is learned. You and your adversaries can learn to be better managers of conflict, but you have to work at it.

Ten rules of thumb for negotiating disagreements:

1. Adversaries have a right to disagree.

2. Feelings are real. Do not ignore them. People may distort the facts, but their feelings are important.

3. Listen to everyone's feelings. If people are ignored, problems will probably develop later.

4. Negotiate behavior or policy first; do not try to negotiate values.

5. Avoid threats; they are usually not effective.

6. Seek compromise and input from everyone. Expect some flexibility.

7. A sense of timing is important. Learn how adversaries feel before you make suggestions for a time-out or to move ahead.

8. If you reach a stalemate, ask if you can make suggestions, but do not impose solutions. Say, "Have you

thought about . . . ?" or "One thing that might work is . . . What do you think?"

9. Communicate a sense of expectancy toward agreement. Demonstrate to all adversaries that you think a solution is feasible (if it is).

10. Develop a tentative set of agreements, especially if the conflict is severe, before you seek final agreement.

Let the tentative agreement "soak" awhile so all parties will understand it and be able to suggest changes, if they are needed. You may want to break here before a final session.

For more information on conflict resolution, see *Interpersonal Conflict* by Joyce Hocker and William W. Wilmot, 2nd edition, William C. Brown Publishers, Dubuque, Iowa, 1985; *Stress and Wellness* by Jerry W. Robinson, Jr., Wellway Publishers, Champaign, IL, 1985; and *Conflict Management in Soil and Water Conservation Districts* by Jerry W. Robinson, Jr., and Philip A. Marcus, University of Illinois Cooperative Extension Service, Urbana, IL, 1983.

How Farm Managers Make Risky Decisions

Agriculture is a high-stress industry. The management of farm and ranch businesses is fraught with risk and uncertainty. Agricultural managers must consider the risks associated with the ever-changing political, social, economic, and ecological environment in which they operate. Farm managers face the risk that it will not rain—that it will rain but at the wrong time—that the old tractor will break down—that the new irrigation system will become obsolete—that the farm program will change—that new regulations will increase costs—that the employee will quit.

Living with Uncertainty

Uncertainty, a situation where a number of different outcomes are possible, is what makes our lives both interesting and frustrating. If it were not for uncertainty, there would be little reason to watch a football game or stay until the end of a suspenseful movie. The frustration associated with uncertainty is because of the risk it involves. Among the uncertain outcomes may be some negative consequences, which we

would prefer to avoid. Risk, then, refers to the chance of adverse outcomes associated with an action. The greater the uncertainty, the greater the risk.

Agricultural managers cannot make decisions without considering the future, and the uncertainty and risk that the future holds. Because the future is unpredictable, we cannot eliminate risk, even if we wanted to. Eliminating risk would also eliminate the potential profits. Successful farm management depends on taking risks that are consistent with the goals and financial position of the business. The key to success is to take the right risks. Identifying these right risks requires better understanding of the various sources of risk, their chances of occurrence, and their implications for the economic performance of the business.

Types of Risks

Identifying the different events or sources of risk that affect the outcome of a decision is a crucial step in the decisionmaking process. The relative importance of the sources of agricultural risk differs among enterprises and

A. Gene Nelson, Professor and Head, Department of Agricultural and Resource Economics, Oregon State University, Corvallis, OR

changes over time. The following checklist is a guide to identifying your risks:

- **Market Risk.** The variability and unpredictability of the prices that farmers receive for their products and that they pay for production costs are market risks. In short, fluctuating supply and demand conditions result in price variations.

- **Production Risk.** This source of risk is a result of the variability in production caused by such unpredictable factors as weather, disease, pests, genetic variations, and timing of practices. Examples include variations in crop yields, machinery breakdowns, and feed conversion efficiencies.

- **Financial Risk.** Financing assets that the business controls creates risk. The increased use of borrowed capital leaves the operator vulnerable to not having enough cash to meet obligations or of not having adequate credit. Other examples of this source of risk include the possibility of losing the lease on the land and the ultimate disaster—bankruptcy.

- **Obsolescence Risk.** The rapid development of new technology can make current production methods obsolete shortly after important investments have been made. The possibility of adopting new technologies too soon or too late is a risk farmers face.

- **Casualty Loss Risk.** This is a traditional source of risk referring to the loss of assets as a result of such events as fire, wind, hail, flood, and theft.

- **Legal Risk.** Governmental laws and regulations are a growing source of uncertainty for farmers. Changing social attitudes have resulted in laws and regulations governing environmental protection, water quality, food safety, and other farm-related matters. In addition,

there is the risk of lawsuits resulting from accidents and other events.

- **Human Risk.** The character, health, and behavior of individuals are unpredictable and contribute to the risk in farm management. The possibility of losing a key employee during a critical production period is one example of this type of risk. Dishonesty and undependability of business associates are other examples. Also, family needs and goals change, sometimes unpredictably.

Psychological studies have shown that business managers tend to overlook risk considerations as they make decisions. They do not deal with risk explicitly. In fact, ignoring risk may be a natural tendency to protect our sanity. For example, consider your decision to drive to town. You know there is always a chance that you will be injured in an automobile accident on the way. By ignoring this risk, you avoid having to anguish over the probabilities and consequences of this decision. However, past good luck does not guarantee future success. And when it comes to making decisions in today's risky agricultural climate, the wise farm manager must explicitly consider various sources of risk.

Profiles in Risk-Taking

Managers respond to risk in different ways. Just as we classify people as being optimistic or pessimistic, conservative or liberal, we can also classify people according to their attitudes about taking risks—risk avoiders or risk takers.

Let us use two hypothetical examples to illustrate these two types of managers.

Risk Takers. The risk takers are the plungers, the more adventurous types who willingly make risky decisions.



Farm management is fraught with risk and uncertainty. This mature ear of drought-stricken corn from a farm in Lamon, IA, reveals poor pollination and stunted growth. (USDA photo by Ron Nichols, 88BW1562-12)

They are willing to accept greater risk in return for the small chance of a higher income.

Roy Riggins is a risk taker. He rents his 600-acre corn and soybean operation in western Illinois. The operation consists of three tracts that he leases on a 50-50 crop-share basis from two retired farmers and a widow. He is single with no family, and, as a result of a small inheritance and a couple of favorable production years, his debt-to-asset ratio is down to less than 10 percent. He owns all of his machinery and hires part-time labor to help with field operations during the critical seasons.

With the crop-share lease, Roy feels that his risk exposure in case of poor weather and low yields is relatively low.

Therefore, he does not purchase multiple-peril crop insurance. When it comes to marketing, he uses a mix of strategies, including cash sales and forward contracting. Although he does not speculate on the futures market, he speculates with the grain he produces by holding a portion of the crop in storage in an attempt to get the best possible price.

Roy has analyzed his financial situation, and, based on his net worth, he feels that he is in a strong enough financial position to weather a few low-income years and still stay in business.

Risk Avoiders. These managers are the more conservative types who have a preference for less risky decisions. Risk avoiders are willing to sacrifice

the small chance of higher income for less risk.

Bill Boyer tries to avoid risk whenever possible. He has a family with two small children and is buying his farm in eastern Oregon. He has a diversified, irrigated operation producing potatoes, alfalfa, wheat, and corn. To purchase his operation, Bob had to take out a sizable mortgage. As a result, his debt-to-asset ratio is just above 50 percent. He also has to borrow to meet operating capital needs; as a result, his cash-flow situation is very tight.

Bill has concentrated on improving the management of his irrigation system in order to reduce production risk and costs. He purchases crop insurance to protect against crop failures. His marketing strategies include forward contracting whenever possible. Bill is more interested in selling at a price that will meet his cash-flow needs than he is in receiving the highest possible price.

For these two managers to be happy with their decisions, they have to make choices that are consistent with their attitudes toward risk. Their attitudes probably will change over time. This is to be expected because people's goals, as well as the financial positions of their businesses, change over time. Their reaction to a particular risky decision will also depend on the possible gains and losses associated with that decision. Thus, as is characteristic of much hu-

man behavior, it is difficult to predict how individuals will react to risky situations.

Classifying decisionmakers according to their attitudes about risk is not a judgment about their managerial ability. There are successful farm managers who tend to be risk takers, and there are successful farm managers who are more comfortable avoiding risk. They each have their own management style—proving that there is more than one way to successfully manage a farm business.

The Payoff Matrix

The framework for making risky decisions described in this chapter is based on the fact that farm managers must choose among alternative actions, the outcomes of which depend on events which are beyond their control. The outcomes of each combination of choices and events is known as a payoff.

Constructing a table showing potential actions, events, and payoffs can help a farm manager explicitly consider risk in the decisionmaking process. This table, called a payoff matrix, is helpful when considering a number of choices, and it can give you an idea of the range of possible consequences of each action.

Table 1 is an illustration of this approach. First, list the decision alternatives: in this case, whether to apply 20

Table 1. The Payoff Matrix: Net Returns for a Fertilizer Application Decision

Event	Decision alternatives: Amount of fertilizer to apply		
	20 units	40 units	60 units
	Net returns in dollars per acre		
Low rainfall	74	70	63
Normal rainfall	116	118	117
High rainfall	134	160	168

units, 40 units, or 60 units of fertilizer. To build the matrix, chart the decision choices against the possible events: in this case, whether there will be low, normal, or high amounts of rainfall. We estimate the crop yields in bushels per acre for each combination of decision alternatives and events. Then, multiply each yield by the expected net selling price of the crop. Since we are concerned with net payoffs, it is necessary to subtract fertilizer costs per acre from each figure.

We now have a payoff matrix. By itself, a payoff matrix cannot dictate the best decision, but it does provide a convenient guide, summarizing the information to be considered. By organizing the decision in this way, it is easier to focus on what can be controlled (the alternative actions) and what cannot be controlled (the possible events).

Budgeting in this framework involves preparing budgets for each action and event combination. With careful budgeting of all of the possibilities, the actual outcome should be no surprise. Potential outcomes will have been considered before arriving at a decision.

Assessing Probabilities

Along with the payoff matrix, another valuable tool for considering risk in decisionmaking is the use of probabilities. Probabilities provide a means of summarizing what we believe and know about the future. Although the most extensive use of probabilities has been in the area of weather forecasting, there is great potential for their use in business management.

Probabilities based on a decisionmaker's personal beliefs about the chance of an event occurring are called personal probabilities. In estimating these personal probabilities, decisionmakers should consider their own ex-

perience, the opinions of experts, and the available data. Personal probabilities allow decisionmakers to summarize everything known about a future event with numbers so they can deal with risks explicitly. Techniques have been developed to help managers estimate their personal probabilities.

Putting It All Together

The payoff matrix guides the budgeting process and summarizes the components of the decision problem, the alternative actions, and the events. Personal probabilities summarize what the manager believes about the future. By combining personal probabilities with the payoff matrix, the farm manager can evaluate the risk associated with the decision alternatives.

These steps help farm managers explicitly spell out the thought processes that they already use intuitively in making risky decisions. Many decisions are too complex and important to be handled by intuition alone. A more formal approach provides the discipline to ensure that all available information has been utilized.

Risk analysis does not simplify decisionmaking or eliminate the agony of making difficult choices. More importantly, risk analysis does not eliminate risk, but it can help the farm manager select the right risks to take in the often uncertain world of U.S. agriculture.

For further information on risk-taking in farming, see *Farm Business Management: The Decision-Making Process*, third ed., Chapter 8 by Emery N. Castle, Manning H. Becker, and A. Gene Nelson, Macmillan Publishing Co., New York, 1988.

Entering Farming in the 1990's

So you think you want to farm? You are in good company. Each year, many people consider entering farming on the basis of a full-time or part-time occupation, or primarily to achieve a preferred way of life.

These prospective farmers or farm employees have a variety of backgrounds. Some are just beginning their careers while others have had substantial experience in a farm or nonfarm occupation. Some have had no farming experience. Some choose farming as a way of life or as a way out of their present lifestyle. Others view farming as an alternative occupation—either as a farm operator, supervisor, or employee. To make a success of a farming venture, it is essential to first analyze personal goals and set a strategy to achieve them.

Farming in the Mid-1980's

An overview of the sizes and types of American farms can help the beginning farmer target a strategy for entering farming. U.S. farms vary greatly in size and type. In 1985, 72 percent of

U.S. farms were best characterized as a "rural residence" or "small part-time" farm. These farms produced only 10 percent of the total gross farm income, with off-farm income being used to cover \$1,000 to \$2,000 of average yearly losses of these farms.

"Dual-career" farming operations represented 14 percent of farms, and produced about 16 percent of gross farm income. For this group, off-farm income represented 61 percent of the net income of the typical family. Most of these farms would be classed as part-time farms, although those with gross incomes above \$75,000 could actually have been considered small, full-time farms.

Full-time commercial farms ranged from moderate-sized, sole proprietorships to "super firms" employing a number of people and involving millions of dollars of capital. Although full-time commercial farms represented only about 14 percent of U.S. farms in 1985, they produced 74 percent of that year's gross farm income. And while off-farm income per full-time commer-

Kenneth H. Thomas, Professor and Extension Economist, and Michael Boehlje, Professor and Head, Department of Agricultural and Applied Economics, University of Minnesota, St. Paul, MN

Selected Characteristics of U.S. Farms, by Farm Size, 1985

	Part-time farms			Full-time commercial farms		
	Rural residence	Small part-time	Dual career	Moderate size	Large size	Super firms
Gross farm income						
	Under \$10,000	\$10,000/ 39,999	\$40,000/ 99,999	\$100,000/ 249,000	\$250,000/ 499,999	\$500,000 and over
No. of farms (000)	1,164	473	323	221	66	27
Percentage of total farms	51.2	20.8	14.2	9.7	2.9	1.2
Percentage of total gross	2.8	7.5	15.7	25.2	16.6	32.2
Net farm income per farm (\$)	-1,878	-1,017	6,566	36,660	99,661	640,010
Off-farm income per farm (\$)	22,091	16,625	10,347	10,551	11,447	15,448
Percentage of income from off-farm sources	109	106	61	22	10	2

Source: *Economic Indicators of the Farm Sector, National Financial Summary, 1985, Economic Research Service, USDA, ECIFS 5-2*. The names used to describe farms in these various income categories are those of the authors of this chapter.

cial farm was about the same as for part-time and dual-career farms, this supplemental income represented only 2 to 22 percent of full-time commercial farms' total net incomes.

Commercial farm earnings derived by farmers from a similar resource base also vary greatly. For example, in a group of southwest Minnesota farms, those with the highest 20 percent of earnings had labor and management earnings of \$109,483 in 1988, while the lowest 20 percent had labor and management earnings of -\$6,598. U.S. farms also are diverse regionally in the products they produce—from New England's dairy farms to the Midwest's corn and soybean farms to the Mountain States' specialized livestock ranches to the West Coast's specialized fruit and vegetable farms.

Entering Farming Part-Time

In 1985, about 85 percent of the 2.3 million farms in the United States could

be classified as part-time operations. People operating these farms entered farming while maintaining their employment in the nonfarm sector—or vice versa.

Many people enter part-time farming primarily to provide themselves and their families with an alternative way of life. Their farming enterprise is usually small, possibly inefficient, and often operated at an economic loss. The farm family's willingness and ability to absorb these losses often determine whether or not their part-time farm will remain operable. Over time, these operations may disappear or make changes to operate more efficiently.

Other part-time farmers enter farming on a more established, dual-career basis, combining a substantial farming enterprise and a nonfarm job. If organized and operated properly, such a farm enterprise can add to family net income and possibly net worth. Successful part-time farmers often have enterprises that

give high returns to scarce labor. These enterprises must be managed efficiently, and overhead expenses (such as machinery costs) must be kept in bounds. This dual-career approach may be maintained over a considerable period of time.

Combining farming and off-farm employment may be a logical strategy. However, if you are using this strategy as a method of gaining entry into full-time farming, you must work at becoming a good manager and at becoming known in the community as a good farmer. Managing finances to build net worth demonstrates to creditors an ability to manage money effectively. Recognize that taking the step to full-time farming may never happen. Often part-time farmers become accustomed to good family living and hesitate to give up the security they have acquired in their nonfarm jobs.

Working as an Employee

When considering full-time farming as a career, you usually think of establishing your own farm operation. But with the wide range of sizes of commercial farm businesses today, keep in mind that there will be increased opportunities to enter farming as an employee of an established operation. Depending on training and experience, it may be feasible to enter farming as a semiskilled or skilled employee, a supervisor, or even a resident manager. Any of these routes may become permanent employment in a large, existing operation, or lead to establishing your own farming operation.

Entry into farming as an employee may be particularly appealing to those having little farming experience, since they can learn by becoming an employee of a large, established farm operation. It may be necessary to first start as a semiskilled worker and

progress to positions of increasing responsibility, such as a herder for a livestock component of a business, and eventually the overall manager of the entire farm business—under the watchful eye of the owner(s).

An advantage of being an employee of such a business is the experience gained in using the latest farm technology, marketing techniques, and financial strategies in farming. Therefore, it is important to choose an operation that is up-to-date and uses current methods.

The role of supervisor or resident manager will be so challenging and rewarding for some that they may decide to remain in this role throughout their farming careers. But for others, the questions will eventually arise as to when to resign and how best to establish their own farm businesses.

One approach is to accumulate sufficient funds to acquire a smaller established farming operation when the opportunity arises. A second alternative is to use a phase-in approach—that is, to use accumulated savings to purchase land or key machinery and lease it to the operation you manage, until it is feasible to start your own operation. The advantage of this approach is that if the value of assets such as land continues to rise, it may be possible to acquire some of these resources earlier at a lower price than if purchases were delayed until you had saved enough money to begin a new operation.

Proper compensation is an important issue that must be faced to successfully start a career in farming as an employee, supervisor, or resident manager. An individual with managerial capabilities should expect to receive more compensation than one who is a semiskilled worker charged with carrying out day-to-day farming activities. If the incentive payments are made in cash, prob-



So you are thinking about entering farming? This scene reflects a passing of the trade from one set of hands to a younger set of hands. (USDA photo by James Karales, 055-30-5)

lems usually are not encountered when the manager uses the cash to start his or her own operation. However, in some cases the incentive payment is not made in cash. Instead, it is allocated as shares of ownership in the farming operation. In this situation, you need a prearranged equitable agreement for liquidating shares of ownership when you want to begin your own farm.

Becoming a Partner

Quite often, a prospective farmer has an opportunity to become a co-owner of a moderate-sized to large farming unit that is fully equipped and ready to farm. This may involve a family operation or unrelated situation, and may offer even more opportunity for independent decisionmaking and eventual ownership and control. In this case, take care to ensure that the unit is large enough to offer a reasonable chance at

financial progress, and that there will be an opportunity to buy into the operation—at least into the machinery, equipment, and breeding stock. If, after a short testing period, it appears that this is a good business unit and the parties cooperate well, develop longer range objectives and plans for business development and partial transfer to the new partner.

Full-Time Farming on Your Own

The third alternative is to “do it on your own”—to put all (or most) of the resources together with the assistance of a creditor or landlord. Under today’s conditions, this option is generally feasible only for the exceptional manager with considerable equity.

For many, the more realistic way to start is to piggy-back on someone else’s operation in a joint venture. This may

be an outgrowth of the preparation stage, where you have worked for a good farmer who is willing to help you get started on your own. One such piggy-back arrangement might involve an exchange of labor for machinery or even for the rental of some land. It may involve starting on a part-time basis and becoming acquainted with a neighboring farmer who is willing to share equipment and management know-how and get you started in a live-stock operation.

Fundamentals. The following are some fundamentals that a young farmer starting mostly on his or her own should keep in mind when developing a farm business:

Most successful business people did not start at the top.

- Do not try to get too big too soon. Develop your unit over time, keeping its size consistent with your management skills and financial position.

- Establish a good track record showing your ability to generate and manage income.

- Have long-term goals that you are striving for with plans for attaining them.

Most beginning farmers have adequate labor but limited capital.

- Use your scarce capital to purchase items that bring high returns, such as fertilizer.

- Piggy-back with an established operator, when possible, to reduce pressure for buying equipment and to have access to management help.

- Substitute labor for capital when possible. Use smaller equipment and existing buildings where feasible.

- When possible, select labor-intensive enterprises to make fuller, year-round use of labor supply, for example, a dairy or hog operation.

- Gain control of resources in ways that will give good returns and make effective use of leverage, yet protect the liquidity position of your business, such as crop share rental of land.

- Minimize cash-flow demands, as well as risk of large losses.

- Manage risks carefully. Employ insurance and risk reducing marketing strategies, and consider diversified operations.

Over time, capital availability will depend on your management capability.

- Establish a good production and financial record. Do not try to grow too fast.

- Spend time becoming a better manager; develop your production, marketing, and financial skills.

- Secure management help when possible—from an Extension agent, adult vocational agricultural course, creditor, professional manager, or good farmer (see Section VII, “Management Services: Resources You Can Tap”).

Keep fully employed.

- While the unit is being developed, full employment may require off-farm work.

Keep family living costs in bounds.

- Usually the starting farm family must sacrifice its standard of living to a substantial degree to achieve financial progress.

Planning for Farm Expansion

Expansion has been commonplace for farm managers attempting to improve income. In 1969, the average size of a U.S. farm was 369 acres; in 1988, it was 463—a 25-percent increase in 20 years. The reasons for the popularity of expansion and the increased concentration of agricultural production into fewer but larger farms are many.

The continuing emergence of new, capital-intensive technology with strong economy-of-size features has been a principal reason. Such technology (for example, a larger, more productive tractor), once purchased, may not be fully utilized. Through increased use, fixed costs—including depreciation, interest, property taxes, and insurance—can be spread over more units, resulting in lower per-unit costs. Additionally, lower input prices and/or higher commodity prices may be available if volume is increased.

Government programs that stabilize prices and provide benefits based on volume of production also have encouraged farm expansion. Favored income

tax treatment of capital gains and depreciable capital assets has reduced the cost of investing in additional land, machinery, buildings, and breeding animals.

In some cases, growth has occurred to more effectively utilize available management resources. Finally, if the per-unit revenue and cost relationship is favorable and constant at different levels of production, net income can be increased by producing more units.

Unfortunately, expansion has not always resulted in higher farm income. For some expanding farm businesses, poor timing resulted in falling profit margins (due to unanticipated rising costs, falling commodity prices, and/or crop failure). Other farm businesses were unable to cope with the management and labor challenges associated with a larger business. For some farm businesses, the debt incurred by expansion was excessive, overpriced, and/or inappropriately structured. And some farm businesses expanded too extensively or too fast.

Gayle S. Willett, Extension Economist, Farm Business Management, Washington State University, Pullman, WA

Basic Planning

Effective planning, however, can improve expansion decisions.

Prerequisites for Planning. A prerequisite in considering farm expansion is for all involved parties to agree that a larger operation is a desired goal. Expansion often implies the assumption of added financial risks, less leisure time, and increased personal stress. If the involved parties are not willing to accept these challenges, no amount of planning and analysis is likely to assure a successful expansion program.

Another prerequisite for successful expansion is the absence of major business weaknesses. Preexpansion problems often become postexpansion crises. A good record system is needed to identify weaknesses. A good record system permits the timely preparation of complete and accurate balance sheets, accrual income statements, cash-flow statements, and enterprise reports, as well as income tax information. Without a good financial records system, a manager is unlikely to have the understanding and control of the business required to effectively manage a larger operation. (See Part III, Chapter 1 for more information on recordkeeping.)

With these prerequisites in mind, the next concern is planning the proposed expansion. Comprehensive planning is needed to convince all involved parties—inside and outside the business—that the proposal is financially acceptable. Planning efforts occur in two phases: (1) long-range and (2) transitional.

Long-Range Planning. The task of long-range planning is to evaluate financial performance when the expansion program has been fully implemented and is in full stride. This evaluation should include a financial analysis that addresses three key questions:

- (1) Will the expansion be profitable?
- (2) Will there be enough cash-flow?
- (3) Are the risks acceptable?

The overriding concern about expansion is whether acquiring control of additional resources will generate a profit that is sufficient to compensate for the added risks. If expansion requires a major capital investment, profitability needs to be measured in terms of capital performance (for example, rate of return on the added investment). Expansion also may require a large increase in operator labor and management; it is important to determine if sufficient income will accrue to cover these personal resources.

Although profitability and cash-flow correlate highly, acceptable performance for one does not necessarily imply the same for the other; it is necessary to analyze both. A cash-flow analysis can determine whether the expanded business will generate sufficient cash revenue to meet its cash obligations in a timely manner. More specifically, determine if funds are available to pay operating expenses as well as income and Social Security taxes, to retire term (over 1-year maturity) debts, to replace depreciable assets as they wear out, to maintain a contingency reserve, and to provide an acceptable living standard.

Risk also should be addressed in a long-range financial analysis. The business' ability to withstand risk is referred to as its solvency position, measured by net worth and by the percentage of indebtedness (total debt ÷ total assets). A higher net worth and a lower percentage of indebtedness imply stronger solvency and an increased ability to withstand risk. Thus, there is a need to consider the impact of expansion on the farmer's solvency or risk position.

Transitional Planning. If an expansion proposal passes the longer range

profitability, cash-flow, and risk tests, it may be appropriate to conduct a transitional analysis. Even though the business is projected to perform satisfactorily once the expansion program is fully phased in, there may be problems in implementing the program. For example, a farmer who expands by adding a new enterprise may experience below-average yields until new production and/or marketing practices are mastered. Even expansion of existing enterprises may pose new challenges (for example, management of hired labor) and temporary substandard performance.

Thus, when the expansion proposal is substantial and the expansion is likely to involve accelerated costs and/or delayed income, a transitional analysis can be crucial to the success of the expansion. A transitional analysis typically estimates monthly, quarterly, or annual cash-flows during the period required to phase in the expansion program. The transitional analysis can reveal temporary cash-flow deficits and the need for additional financing. This information is essential to getting the right amount of capital at the right time.

The final phase of expansion management is monitoring and controlling the business as the expansion program is implemented. Records and transitional period cash-flow projections are key control tools. A comparison of actual cash-flows with projected cash-flows as the transition period unfolds may reveal discrepancies between the two. By comparing the two, the manager is in a position to quickly address an emerging problem before it becomes a crisis threatening the entire expansion program. Adopting appropriate risk control strategies is another means of reducing the impact of unexpected adverse developments. The exact nature

of these strategies will vary with the type of farm and expansion program.

The Steins' Dairy Farm Expansion

Mr. and Mrs. H.O. Stein own and operate a dairy farm. The Steins have three children—two sons, ages 22 and 16, and a daughter, age 18. The oldest son is about to graduate from college, is getting married, and wants to return to the farm after graduation.

The Steins' farm includes 140 mature cows and 160 acres of cropland. Mrs. Stein has a part-time secretarial job which earns her about \$5,000 per year. As a result of 25 years of hard work and good management, the Steins are financially stable. However, the business is not large enough to provide adequate support for themselves, a teenage son at home, a daughter in college, and the graduating son and wife. Even though the oldest son's wife-to-be is assured of an off-farm job earning \$15,000 per year, if the oldest son joins the business it will have to expand.

Goals Agreement. After several family discussions, agreement has been reached to allow the son and his wife to join the business, provided the proposed expansion program is financially feasible. A general partnership arrangement is desired with the son committing full-time to the dairy. Also, longer term plans are for the son to gradually acquire a financial interest in the farm's nonreal estate assets. The incoming son has agreed to initially limit his living withdrawals to \$5,000 per year, recognizing that his wife is earning \$15,000 from her off-farm job. Mr. and Mrs. Stein would like to have about \$25,000 per year to support themselves and their two other children.

The Current Situation. No major weaknesses are apparent with the H. O.

Stein business. Production records indicate the annual herd average is about 18,000 pounds of milk per cow. The Steins keep good financial records. The farm has realized a modest profit for several years and financial obligations have been met in a timely manner.

The Steins feel that expansion offers the best opportunity to increase income. An uncle who is a nearby farmer wants to retire and is willing to sell his 60-cow herd, plus replacement heifers, to the Steins for \$81,500. Furthermore, the uncle has agreed to finance the sale with a 5-year loan carrying a 10 percent interest rate, to be repaid in five equal annual payments. Discussions with contractors and suppliers indicate an additional \$94,440 is needed to expand housing, milking, feed storage, and manure handling systems. A loan officer at Farmers Bank, which has provided short- and intermediate-term financing for the Steins over the past 20 years, indicates a loan of \$94,440 would probably have a 12-percent interest rate and a 7-year repayment period.

The Long-Range Financial Analysis. The Steins' initial concern is whether financial performance of the 200-cow business will be acceptable once the expansion program is fully implemented and transitional problems, if any, have subsided. Since the expansion proposal affects many areas of the business, the Steins opt to use a computerized whole-farm budgeting tool called FINLRB (see Section III, Chapter 8). This program was developed by Professor Richard Hawkins and coworkers at the University of Minnesota and is available through the Cooperative Extension Service in many States. The analysis addresses three important aspects of financial performance: profitability, cash-flow, and solvency (or risk) (see table).

As reported on line 5, expansion is projected to increase annual net farm income by \$20,779 (\$64,925-\$44,146). Also, the rate of return on total farm capital investment rises from 4.3 percent to 5.7 percent (line 10). Perhaps the most critical profitability test is the rate of return on the added investment and how that rate compares to the interest cost. As noted on line 13, the \$175,940 expansion investment is projected to earn an 11.8 percent return. The average interest rate on the added investment is 11.1 percent; thus, the investment is marginally profitable.

The second phase of the financial analysis compares cash inflows with cash outflows. Net cash inflows from both farm and nonfarm sources are projected to increase from \$89,146 to \$131,925 (line 16). Included in that estimate is the future daughter-in-law's \$15,000 off-farm salary. These cash inflows must be used for family living expenses (line 17), income and Social Security taxes (line 18), principal payments on term (over 1 year) debt, and replacement of depreciable capital assets (line 21). After meeting these cash needs, a cash surplus of \$8,104 is projected for the preexpansion business and \$17,493 after expansion (line 23). Under the adopted assumptions, the expansion proposal clearly strengthens the farm's cash-flow position.

Solvency (or ability of the business to assume risk) is addressed in the third segment of the analysis. Since the entire \$175,940 investment is debt financed, the debt-to-asset percentage jumps from 24.6 to 38.3 (line 27), and the net worth is unchanged (line 26). Both of these solvency measures are projected at the beginning of the expansion program. Moreover, a subsequent larger annual increase in net worth is projected to occur with expansion

Financial Analysis of the Added Investment Required for Business Expansion, H. O. Stein.

	With current herd	With expanded herd
Plan description		
Number of dairy cows	140	200
Total hours of labor	7,435	9,734
Change in investment	0	\$175,940
Change in debt	0	175,940
Projected profitability		
1. Gross cash farm income	\$330,719	\$471,556
2. Cash operating expense	246,573	359,631
3. Net cash farm income (1-2)	84,146	111,925
4. Depreciation	40,000	47,000
5. Net farm income (3-4)	44,146	64,925
6. Interest paid on debt	17,990	37,473
7. Value of operator & family labor & management	29,036	48,578
8. Return to total capital investment (5+6-7)	33,100	53,820
9. Total farm capital investment	761,763	937,703
10. Rate of return on total farm capital investment (8÷9)	4.3%	5.7%
11. Added returns to added capital investment (line 8)	—	20,720
12. Added capital investment (line 9)	—	175,940
13. Rate of return on added capital investment (11÷12)	—	11.8%
Projected cash-flow		
14. Net cash farm income (line 3)	\$ 84,146	\$111,925
15. Net nonfarm income	5,000	20,000
16. Total farm & nonfarm cash inflow (14+15)	89,146	131,925
17. Family living	25,000	45,000
18. Income tax & Social Security tax	9,874	16,265
19. Principal payments	16,925	39,635
20. Net cash available (16-17-18-19)	37,347	31,025
21. Cash needed for replacement of capital assets	45,000	52,000
22. Nonreal estate principal payments (included on line 19)	15,757	38,467
23. Cash surplus (deficit) (20-21+22)	8,104	17,493
Projected solvency (beginning of expansion)		
24. Total assets (farm + nonfarm)	\$789,079	\$965,019
25. Total debt (farm + nonfarm)	194,120	370,060
26. Net worth (24-25)	594,959	594,959
27. Debt/asset (25÷24)	24.6%	38.3%
28. Change in net worth per year (5+15-17-18)	14,272	23,661

(\$23,661) than with the smaller herd (\$14,272) (line 28). These increases in net worth result from farm and non-farm income exceeding taxes (income and Social Security) and family living outflows.

Another risk dimension, not shown in the table, is the vulnerability of the proposed adjustment to falling commodity prices or production and/or rising production costs. For example, additional analysis indicates that a modest 10-percent decrease in commodity prices or production results in a net farm income of \$6,193 for the 140-cow herd and \$11,681 for the 200-cow herd. Under the same circumstances, the cash surpluses shown in the table become cash deficits of \$20,325 and \$21,739 for the current and expanded business, respectively. Thus, it can be concluded

that due to an increased debt load, expansion causes a slight deterioration in ability to withstand downside risk as measured by cash-flow position.

In summary, the long-range analysis indicates that the proposed expansion is marginally profitable, strengthens cash-flow, and does not represent a major reduction in the ability to withstand risk. Additionally, the proposal appears to make it financially feasible for the son to return home and farm with his parents. The Steins likely will want to further pursue the expansion proposal.

Transitional Planning. The Steins' planning should now focus on the transitional period. The Steins are contemplating a major expansion and adjustment problems can be expected. Thus, the Steins should be encouraged to



Poultry producer Maurice Layton of Magee, MS, looks over brooder equipment on his farm. One of the area's largest poultry producers, he has faced decisions about when to expand his operation on more than one occasion. (USDA Photo by George Robinson, 0476R416-11)

budget cash inflows and outflows over the first 1-3 years of the expansion to identify additional capital needs. An estimate of cash deficits should permit a more effective job of planning for cash needs, thus reducing the risk of experiencing loan payback difficulties, family living shortfalls, and perhaps failure to reach long-term goals.

Lender Documentation. Once the Steins have completed the long-range and transitional analysis and are convinced that the expansion proposal is feasible, they should prepare the documentation needed to support a loan request. That documentation should include the long-range and transitional analysis, plus a current balance sheet. In addition, balance sheets, income statements, cash-flow statements, tax returns, and production records for the past 3-5 years should be obtained. If this documentation is positive and effectively communicated to the lender, lender risk is reduced and the likelihood of the Steins obtaining the desired funds under favorable terms is increased.

Expansion Control. Once the funds needed to implement the expansion are forthcoming on terms consistent with the financial analysis and the investment is made, the Steins must use whatever good management tools are available to control the expansion program. Keeping good records—particularly cash-flow records—and comparing actual performance with projected performance should be a helpful control tool. Also, the Steins should give close consideration to other options they may have for reducing risks, especially during the transition period. These may include an intensive herd health pro-

gram, forward contracting feed purchases, forage testing, and maintaining a higher level of financial liquidity.

Planning Payoffs

Some farm managers may be reluctant to do this comprehensive planning and analysis. Foremost among the reasons for their reluctance is the time, mental anguish, and frustration associated with predicting the future. However, as long as the payoff from planning and analysis exceeds the costs of the time and effort involved, it is a good investment. Given the heavily capitalized, highly competitive, low-margin, and high-risk nature of today's agriculture, the benefits from comprehensive expansion planning are likely to be considerable. Clearly, expansion decisions based on thoughtful projections of profitability, cash-flow, and risk will be superior to decisions based on hunches, hope, and availability of funds.

Choosing Enterprises for Your Farm

One of the most basic and important decisions a farmer must make is to choose the best combination of products or enterprises. This decision is one of the key factors that determine the farm's profitability, and whether the goals and objectives of the farm family will be met.

Perhaps a way to conceptualize the enterprise selection process is to think of developing a series of transparent overlays with each overlay as a component of the process. The first overlay would contain objectives; the next an inventory of resources including markets; a third, the relationships among enterprises; and the next would match the resources available with resource requirements of alternative enterprises. These overlays, one on top of the other, define the possibilities that are physically feasible and that accomplish desired objectives.

Beginning with the first overlay or step, define the goals, personal and financial, that you want to accomplish with an agricultural enterprise. It is important to make these goals as specific as possible. For example, your

goals may include providing a certain amount of work for family members, earning a particular net income, and maintaining stewardship of the land. (See Part II, Chapter 2 for more information on setting goals.)

Once goals are established, the next step is to determine whether they are feasible.

Personal Preferences

Personal preferences can help to narrow the field of alternative enterprises. Not all farmers want to raise hogs, dairy cattle, or vegetables. Decisions are also influenced by the length of planning horizons. The length of time between start-up and harvest ranges from about 40 days for radishes to over 40 years for Douglas fir trees. The desired period between the initial investment and needed return is influenced by the farmer's age and financial position. Financial position also helps determine ability to bear risk and whether capital-intensive enterprises with high up-front costs are feasible.

Past experience with similar enterprises may influence choice. Any new

Richard W. Carkner, Extension Economist, Puyallup Research and Extension Center, Washington State University, Puyallup, WA

enterprise will require an educational investment. How extensive this will be depends on past experience and the technological complexity of the enterprise. A related concern is the management level required for success. An honest self-appraisal of management ability and willingness to learn new skills through self-study or formal training is important.

Location, Climate, Labor

Factors such as location, climate, available labor, and capital can be used to narrow the range of possibilities.

It is no accident that the Midwest is noted for corn and that citrus crops are grown in the Deep South. Comparative advantage provides a partial explanation of why some commodities are produced where they are. Climatic conditions such as rainfall, temperature, and growing-season length influence feasible crop alternatives. Some of these factors can be controlled or altered—but there is a cost. Irrigation may be used to supplement rainfall in arid regions or used to reduce the risk of crop failure where growing-season rainfall is variable.

Other factors to consider include soil, topography, and distance to markets. The interaction of these factors influences production possibilities and production costs.

Viewed collectively, these factors will provide answers to a few key questions related to technical feasibility. What commodities can be produced given the soil, climate, and the presence or absence of certain pests?

Resource Inventory

Because resource requirements vary widely among enterprises, the availability of resources will limit enterprise choice and scale. Resources are traditionally thought of as land, labor, and capital, but add to this list markets, management, and a physical asset inventory including equipment and buildings. Market availability is important, but it is often neglected or assigned a lesser role in assessing the feasibility of an enterprise.

Market. A market assessment will help determine what products can be sold and at what price. In most cases, individual producers cannot develop markets for their products and must work within the framework of existing markets. An exception to this might involve direct marketing to consumers through pick-your-own operations, roadside stands, or other self-marketing enterprises.

Land. An assessment of land might start with a soils map that is overlaid with field sizes, roads, drainage systems,

Table 1. Land Inventory

Soil series or capability		Soil limitations		
Class	Acres	Owned	Rented	(comments)

access to irrigation water, and other important features. A study of soils will help determine the most suitable enterprises—row crops, field crops, forestry, or forage crops for livestock production (see table 1).

Labor. Inventory labor resources by starting with the farm family: How many hours are available from family members and how is their time distributed throughout the year. This is especially important because hired labor is becoming a limiting resource. Low rates of unemployment nationally suggest a highly competitive labor market, and it is expected to stay competitive for the foreseeable future. The availability of labor is only one aspect to be considered; skill and experience levels of potential employees are also important (see table 2).

Capital. Capital represents the pool of dollars available for investment in machinery, equipment, or livestock required for a new enterprise. Capital also is required to purchase seed, fertilizer, feed, and hired labor. Sources of capital include the farmer's personal net worth, equity capital from off-farm investors, income from off-farm employment, and available credit. Together, these sources represent the upper limit of available capital (see table 3).

Management. Management is the resource necessary to combine all the other required resources to achieve desired results. The level of management required varies with the complexity of the enterprises. Some enterprises require a high degree of technical skill and specialized knowledge. Others are less demanding. An inventory of past man-

Table 2. Labor Inventory

Expected labor availability by month:

Source	Cost/hour	Hours by month												Year total
		J	F	M	A	M	J	J	A	S	O	N	D	
Farmer														
Family														
Hired														
Other														
Total:														

Table 3. Capital

Dollars available for investment and annual operating costs:
Sources

Requirements	Personal	Borrowed	Total
Facilities and equipment investment			
Annual operating expenses, cash for feed, seed supplies, etc.			

agement experiences, the willingness to learn new skills, and the opportunities to acquire new information are components of a management assessment.

Relationships among Enterprises

It is important to consider the relationships among enterprises. Some new enterprises may compete with existing enterprises, while others may actually increase the production of existing enterprises.

Enterprises that compete for resources are those that require the same resources at the same time. An increased use of resources in one enterprise would require a reduction in another. Supplementary enterprises are those that require the same resources but at different times of the year. For example, adding a livestock enterprise to a crop enterprise would take advantage of underutilized winter labor and, perhaps, use byproduct feed from crop production.

Enterprises are considered complementary if one enterprise contributes directly to another. For example, crop rotations involving legumes and grains can result in more grain being produced than if land were used for continuous grain production.

Enterprise diversification can also reduce risk. One model to follow in developing a diversified mix of enterprises is to add enterprises until all supplementary and complementary enterprises have been exhausted.

Investigating Alternatives

After identifying your goals, personal preferences, location, the availability of markets and resources, and the relationships among enterprises, the next step is to assess alternative enterprises. Use the information you have assembled to compare alternatives (see table 4).

This process requires assembling information on resource requirements, which in turn requires the development of enterprise budgets and estimates of relative profitability. Resource requirements and production cost information (budgets) can be obtained through your County Extension Agent's office or from the Cooperative Extension Service at your land-grant university. Information should be available on a wide array of crop and livestock alternatives. However, be prepared to supplement the data you receive with your own information. It is also helpful to obtain information from other sources such as farmers who produce the commodities of interest. (See Part III, Chapter 3 for information on enterprise budgets and gross margins as a tool to evaluate the relative profitability of enterprises.)

Realize that enterprise selection is a complicated and demanding process. It should be considered no different than evaluating any other business opportunity. The amount of time and energy spent in research should be directly related to the amount of capital at risk and the potential rewards.

Table 4. Sample Resource Requirements Table

Enterprise requirements example			
Factor/resources	Crop #1	Crop #2	Crop #3
Land			
Soil Required	Special	Fair	Variable
Topography	Level	South facing	Variable
Drainage	Well	Well	Variable
Irrigation			
Labor			
Timeliness importance	Some	Important	Little
Decision/responsibility	Low	Low	Low
Peak season month(s)	March, July	June, July	Fall
Hours per acre	50	120	275
Percentage manual	80	75	60
Capital requirements per acre			
Investment	High	Medium	High
Annual operating	High	High	Low
Management			
Level of management	Medium	Medium	Medium
Timing of management requirement	Periodic	Periodic	Periodic
Market			
Limitations	Possible	Possible	Possible
Type	Local processor	Local processor	Multiple
Profitability			
Gross margin \$/acre	275	90	150
Cash-flow			
Years between initial investment and first harvest	4	2	7

The ABC's of Alternative Agriculture

As we write this, wholesale vegetable dealers in Minneapolis are paying \$4 per pound for French beans and \$2 per pound for scallopini. This should be enough to get the attention of any farmer who has been fighting anemic grain prices. How can a farmer cash in on vegetable prices rivaling those for choice cuts of beef? Or, for that matter, just what is a scallopini? This is all part of one of the big stories of farming in the 1980's—alternative agriculture.

Alternative agriculture is difficult to define. For some, it is as simple as ABC: asparagus, broccoli, and cauliflower. For others, it might be llamas or catfish. One farmer joked that alternative agriculture is any new crop he thinks of first and then watches his neighbor get rich from growing.

No matter what its definition, alternative agriculture always involves choices among enterprises that are not usually grown in a particular farming area. This atypical entrepreneurial choice, more than anything else, is what makes alternative agriculture unique,

from a farm management point of view. Traditionally, farmers have considered such choices as "corn or soybeans?" or "hogs or cattle?" But rarely have many considered "corn or strawberries?" Alternative crops offer new opportunities, but they also provide new challenges. Instead of choosing from a few traditional options, farmers may be faced with dozens of alternatives—and they may have to learn new farming practices.

Why Alternatives?

Some farmers seem to be born for business. They see the opportunities for marketing to well-heeled consumers. If these consumers are willing to pay sky-high prices for vegetables with names most people cannot even pronounce—much less grow successfully—these born-for-business farmers are willing to try to meet that demand. And, most likely, these farmers will succeed.

Unfortunately, many farmers turn to alternatives only when they are faced with continual poor returns from tradi-

Richard A. Levins, Extension Farm Management Specialist,
University of Minnesota, St. Paul, MN, and
Daniel J. Donnelly, Extension Agricultural Science Agent, Maryland
Cooperative Extension Service, Leonardtown, MD

tional crops. Some farmers succeed. For example, some small farmers in southern Maryland questioned the future of tobacco production and turned to vegetables or hogs in time to avert disaster. They had the skills and market access to play the new game. But many grain farmers in other parts of the country found themselves without the labor, capital, or markets necessary to do any better with raspberries than they could with wheat.

While the farm crisis caused farmers to look at alternative agriculture in the 1980's, concerns about the environment may well be the big factor in the 1990's. Already we are seeing livestock bans proposed for areas near critical water supplies, and key herbicides are being withdrawn from legal use on corn. These changes can force the farmer to consider new enterprises and production practices just as \$1.50 corn can. But alternative agriculture is simply not big enough to include all U.S. farmers. Only those who consider it early and study it seriously will succeed.

Headache No. 1

We visited one farmer in southern Maryland who had a particularly large family. We asked how he chose his crops that year. He said he did it by matching the jobs each of his children could do to the jobs each crop required. Not all of us have a labor force of children, but we can all benefit from the wisdom of his answer. It is essential to have adequate labor throughout the season for whatever alternatives are considered.

Labor requirements for alternative crops have many important dimensions. One is obvious—if an enterprise requires so many hours of labor per acre, make sure you have that many hours available. But there are at least three

other factors that are just as important. First, consider the timing of the labor requirements. Many alternatives use most of the labor during a short period of the season. Second, some crops require special crew sizes or work during odd hours of the day. Hanging tobacco is not a one-person operation no matter how much time that person has. Minnesota cauliflower is best harvested in the very early morning to keep it cool. And third, some alternatives require skilled labor. Unskilled harvest labor can quickly ruin a marketing plan that depends on delivering quality products.

When labor is in short supply, consider this problem in comparing budgets for enterprises. Most crop budgets, for example, are prepared on a per-acre basis. Comparing budgets for two similar crops such as corn and soybeans is easier than comparing per-acre budgets for corn and strawberries. The higher labor requirements for one acre of strawberries might force a farmer to give up many acres of corn. Therefore, an acre-for-acre comparison, as opposed to a whole farm comparison, does not give an accurate analysis of profits. Always consider how the entire operation will change with alternatives. (See Part II, Chapter 9 on opportunity costs.)

Even in an area where farm labor is in short supply or the farm manager is not the type to manage a large number of workers, do not rule out agricultural alternatives. Simply be careful about choosing an alternative. In southern Maryland, some tobacco farmers found a good source of supplemental income in hogs. The swine alternative actually took much less labor than their main crop of tobacco.

Machinery and Capital

Choose an enterprise that makes good use of existing equipment, or at least



County Extension Agent Dan Donnelly (l) looks over berry crop grown by James R. Owens. The Owens farm once had tobacco as a main crop but now offers a variety of vegetables and berries to southern Maryland customers. (USDA photo by Larry Rana, 89BW1036-23)

give the matter serious thought. New specialized equipment adds a financial burden to an already risky venture. At the same time, it is important to be creative about how equipment can be used for other purposes. More than one southern Maryland tobacco barn has been converted inexpensively into a hog barn.

The capital requirements for alternative agriculture also deserve close attention. These types of crops are usually expensive to grow. Budgeting petunia seed at \$1,000 per ounce for a new bedding plant operation could be difficult. Unfortunately for most farmers forced into alternative agriculture, capital is the limiting resource. That limit, even more than labor, can put a damper on any venture into alternatives.

While some bankers are quick to accept business plans for traditional enterprises, they may be skeptical of a sure-fire asparagus plan. Asparagus will



Doris Roberts finds the southern Maryland pick-your-own strawberry farm a tasty place to spend her morning. (USDA photo by Larry Rana, 89BW1036-31)

be new to them, and they will rightly require solid financial documents to convince them that the plan is sound.

Markets

Traditional enterprises have traditional markets, so farmers can concentrate on production. This is not the case for alternatives. There are no futures markets, elevators, Government programs, and other such features to make up for a lack of attention to marketing. The fact is, there has never yet been a broccoli shortage, and ration lines for shiitake mushrooms are nowhere in sight. So to be successful, you will have to convince customers to buy from you instead of someone else.

To do this, be creative. A farm consultant in Minnesota advises farmers to use organic methods—not for environmental reasons but because the “organic” label can make a product stand out in a crowded market.

A farm located near an urban area has an advantage over one 40 miles from the nearest town. Capitalize on the urban taste for fresh, local products. There are numerous outlets where you can sell crops—roadside markets, farmers’ markets, specialty restaurants, and food chains. In the past, many farmers saw cities as places to be avoided at all costs. But in today’s markets, cities can be the best sources for getting top dollar for agricultural products.

Rural areas have their advantages, too. In International Falls, MN, about 160 miles from Duluth, County Agent Terry Nennich and a group of enterprising small farmers started a successful venture in broccoli and cauliflower. How did they do it? Not with roadside markets—moose do not eat broccoli. Nennich and the farmers did it by forming an organization that could compete with big operators shipping out of California.



County Extension Agent Dan Donnelly visits with customers who had no problem finding berries to pick at this Lexington Park, MD, strawberry farm. (USDA photo by Larry Rana, 89BW1036-34)

Competing for markets in the big leagues often requires more clout than any one farmer can muster. In Maryland, a cooperative hog-buying station and tomato-packing plant created market opportunities that no single farmer could have built.

Likes and Dislikes

There are hundreds of alternative enterprises. The farm manager's job is to decide which ones will work. An analysis of labor requirements, machinery, capital, and markets is important. But consider individual preferences. Some farmers simply will not raise hogs. Others would probably sell their farms before they would raise chrysanthemums. There are plenty of alternatives, and farmers who are most successful seem to choose ones that they like.

Some farmers spend more time than others researching alternatives before they pass judgment. There are always local farmers with current information on catfish, as well as good contacts in other States on every imaginable crop.

After selecting an alternative crop, start small. Do not plant 20 acres of cauliflower in the first year. One or two will give an indication of what production problems and marketing opportunities will be encountered. Develop approved production practices, line up labor, and let customers see the product. Grow one step at a time. With each step, get help from the local Extension Office. Oh, and scallopini is a type of baby squash.

(See Part II, Chapters 12-16 for case studies of farmers trying alternative crops and marketing strategies.)

Determining Your Competitive Advantage

To be successful, farmers must produce the commodity or combination of commodities for which their resources are best suited. Thus, one of the most important choices farm managers make is deciding what to produce.

The first step in making that decision is to make an inventory of the available resources—land, labor, capital, and management skills. These resources, along with factors such as location, access to markets, and available technology, will determine a farmer's competitive advantage.

Many farmers arrive at the best mix of products—where they have the strongest competitive advantage—through experience. Over time, they find that they make more money by increasing the production of commodities for which they are more efficient in comparison to other farmers and by reducing production of commodities for which they are less efficient.

However, the world is always changing and farmers compete not only with their neighbors and farmers in adjacent States, but also with farmers around the world. As a result, farmers must con-

tinually reexamine their competitive position in relation to commodities they produce.

In evaluating alternatives, consider two key concepts—competitive advantage and comparative advantage. A farmer's competitive advantage is related to, but not entirely determined by, his or her comparative advantage in producing a particular commodity.

Comparative advantage is a concept that refers to the relative efficiency with which resources are used and commodities produced compared to that of other producers. Competitive advantage takes actual market conditions into account; it refers to relationships between the cost at which the product can be supplied and the market price.

We will examine the concept of comparative advantage before turning to the more general consideration of competitive advantage.

Assessing Comparative Advantage

Economists developed the concept of comparative advantage to help people understand their economic niche in so-

John E. Ikerd, Visiting Professor and Extension Economist, University of Missouri, Columbia, MO

ciety. Comparative advantage, essentially, means comparative efficiency. You have a comparative advantage in doing those things you can do more efficiently than someone else. This may sound simple. But assessing comparative advantage involves measuring efficiency differently than many farmers are used to—not in bushels per acre or pounds of milk per cow, but in trade-offs.

Tradeoffs occur when you choose one thing over another. You must give up any benefit associated with the alternative you did not choose. In other words, you cannot have your cake and eat it, too. If you spend your money on one thing, you have to give up the satisfaction of whatever else you might have bought instead. Economists refer to the benefit foregone as the opportunity cost—the value of the opportunity you must forego when you choose an alternative.

Assessing comparative advantage involves measuring efficiency in terms of the output produced divided by the output foregone:

$$\text{Efficiency ratio} = \frac{\text{Output produced}}{\text{Output foregone}}$$

For example, a farmer may have to give up the opportunity to produce 40 bushels of soybeans to produce 120 bushels of corn. The efficiency ratio for corn would be 120 bu/40 bu, or 3. Three bushels of corn would be gained for each bushel of soybeans foregone. The opportunity cost per bushel of corn would be the value, or output, of soybeans (1/3 bushel) foregone for each bushel of corn produced (40 bu/120 bu).

$$\text{Opportunity cost} = \frac{\text{Output foregone}}{\text{Output produced}}$$

Thus, the crop with the highest efficiency ratio is also the one with the lowest opportunity cost.

Comparative advantage is a comparison of the efficiency of two producers who can produce either of two different products. The producer who is more efficient (has the lower opportunity cost) has a comparative advantage in the production of that commodity.

Farmers Andrews and Brown

Take a simple example of two farmers. Farmer Andrews can produce either 150 bushels of corn per acre or 500 pounds of beef per acre on her land using a given dollar amount of resources. Farmer Brown can produce 100 bushels of corn or 400 pounds of beef on his land with the same dollar amount of resources. So who has a comparative advantage in producing what?

It would be easy if Brown could produce more of one thing and Andrews could produce more of the other. But that is not true in this case. Andrews has a more productive complement of resources, so she can produce more of either beef or corn than can Brown. Andrews is said to have an absolute advantage in both beef and corn. Does this mean that Brown simply cannot compete and will be forced out of the business?

Before we declare bankruptcy for Farmer Brown, let us look at opportunity cost. Andrews' opportunity cost of producing 500 pounds of beef is 150 bushels of corn, the amount of corn she would have to give up if she produces beef instead of corn. Her opportunity cost per 100 pounds of beef is 30 bushels of corn. Brown's opportunity cost of producing 400 pounds of beef is 100 bushels of corn. This means that Brown only gives up 25 bushels of corn for each 100 pounds of beef he produces.

Thus, Brown's opportunity cost of producing beef is less, and he has a comparative advantage in beef production. Andrews' opportunity cost of producing 150 bushels of corn is 500 pounds of beef or 3.33 pounds of beef per bushel of corn. Brown's opportunity cost for 100 bushels of corn is 400 pounds of beef or 4 pounds per bushel. Thus, Andrews turns out to be the more efficient producer of corn because she gives up fewer pounds of beef per bushel of corn produced. Therefore, Andrews has the comparative advantage for producing corn.

When opportunity costs are used to compare two producers who are each able to produce two alternative crops, one producer will always have a comparative advantage in producing one

commodity and the other producer will always have a comparative advantage in producing the other commodity.

Comparative Advantage and Competitiveness

As noted previously, comparative advantage and competitiveness are related to each other, but they are not identical. A farmer's competitive advantage reflects the ability to compete with other farmers for a given market. Farmers are said to be competitive if they can supply a given market at a cost below market price. The farmer's comparative advantage in production is an important factor in determining competitive advantage, but there are other factors as well.



Should you plant corn or raise beef? Determining your comparative advantage can help you find your economic niche.

Other factors must be considered in order to translate the concept of comparative advantage into competitive advantage.

Marginality. In the previous example of comparative advantage, we assumed that all resources of a given farmer were equally productive. Obviously, such an assumption rarely holds true in real world comparisons. Two farmers who would consider producing corn or beef typically would have some good cropland and some land that is better suited for pasture. Thus, their comparative advantages change as each specializes by producing more of one commodity and less of the other.

For example, Farmer Andrews might have some land that will produce 200 bushels of corn per acre, but on her less productive land, yields might drop to 100 or fewer bushels per acre. Farmer Brown might be able to produce 150 bushels per acre on his best land but produce yields of 50 bushels or fewer per acre on his less productive land.

Thus, Andrews' and Brown's comparative advantage in corn and beef would be different at different levels of specialization, even if the productivity of land in beef was the same at all levels. Brown likely would have a comparative advantage in using his most productive land in corn rather than trading for corn produced from Andrews' least productive land.

Competition for Markets. In general, farmers' opportunity costs are reflected in overall market prices for agricultural commodities. The price of soybeans, for example, reflects the price that farmers who produce soybeans are willing to accept. They may not be happy with the price, but they nonetheless are willing to put soybeans on the market at that price.

To be competitive, farmers have to be able to sell at prices lower than their competition's. Thus, farmers can evaluate their competitive advantage by comparing their opportunity costs with market prices for alternative commodities.

Farmer Andrews has a competitive advantage in producing corn rather than some other crop if the opportunity costs of producing corn, measured in terms of the value of the crop foregone, is less than the market price of corn. Opportunity cost, in this case, is the value of the crop given up divided by the value of the increase in corn produced. If Farmer Andrews has to give up \$2.40 for each additional bushel of corn produced, the production of corn would have a competitive advantage only if the price of corn is more than \$2.40 per bushel.

Cost Differences. Comparative advantage assumes that farmers use basically the same set of productive resources to produce two different commodities, as in our examples of comparative and competitive advantage. This rarely fits real world circumstances. However, differences in resources needed for producing two different commodities can be accounted for quite easily by using dollar values rather than physical quantities as we did in adjusting for differences in market values.

Assume that producing 150 bushels per acre of corn costs Farmer Andrews \$30 more per acre than producing cotton, which costs \$360 per acre. Then the opportunity cost of producing a bushel of corn would be \$2.40 (see previous section) worth of cotton plus another \$0.20 worth of added production cost ($\$30/150 \text{ bu}$) for corn relative to cotton, for a total of \$2.60 per bushel ($\$360 + \$30 = \390; $\$390/150 \text{ bu} =$

\$2.60/bu). In some cases, this difference in cost may be enough to change the farmer's competitive advantage.

Nonmarket Returns. Many enterprises result in income or returns over and above those that result from the sale of the commodities produced. Government payments are a common example of such nonmarket returns.

Assume that Farmer Andrews could produce either 150 bushels per acre of corn or 600 bushels per acre of cotton and could qualify for Government deficiency payments on either corn or cotton; but also assume that the expected deficiency payment is \$60 per acre for corn but only \$48 per acre for cotton. Farmer Andrews would need to subtract \$12, the difference in expected payments, from the opportunity cost for corn (\$390) and add \$12 to the opportunity cost for cotton. This would result in a \$2.50 opportunity cost for corn ($\$390 - \$12 = \$378$; $\$378/150 \text{ bu} = \$2.52/\text{bu}$) and only a \$0.595 opportunity cost for cotton ($\$345 + \$12 = \$357$; $\$357/600 \text{ bu} = 0.595/\text{bu}$).

The Bottom Line

Competitiveness implies profitability when profit is defined as a return in excess of opportunity costs. However, a profit in this sense does not mean that farmers will always be able to cover their total costs of production. They may not be able to generate sufficient returns to replace buildings, machinery, and equipment, or to meet other fixed costs. In fact, they may not even be able to cover the costs of inputs such as fertilizer, seed, feed, fuel, and labor—typically referred to as variable costs. Profit in this sense means a return that is higher than the costs that are not already committed to the production process—in other words, higher than the opportunity costs.

Farmers who produce commodities for which they have a competitive advantage are making as much profit as possible given the resources available to them to produce the commodities they view as alternatives.

Integrating Production and Marketing Management on a Beef Ranch

The management of a ranch operation, like any other business, requires careful consideration of the interrelationships between production and marketing decisions. An effective tool for integrating the management of the two functions is a production-marketing plan.

A production-marketing plan begins with the producer's goals, considers the alternatives available, and identifies a strategy for action that is flexible enough to accommodate periodic review and changes. Selling is only a small part of the plan. The plan must consider the entire process, from raising the replacement heifer to selling the calf or yearling. By integrating production and marketing into one overall plan, the ranch manager can rationally respond, rather than react, to market conditions. Developing the production-marketing plan is an ongoing process that involves seven key steps:

1. Document production and marketing situation and goals.
2. Learn about and analyze current market factors and price trends.

3. Identify and evaluate available production and marketing alternatives. Develop enterprise budgets and breakeven prices for all potential production and marketing alternatives.

4. Determine profit and price goals or target prices.

5. Develop a pricing plan considering cash, forward contracting, futures, hedging, and option alternatives.

6. Compare production-marketing alternatives and identify the one that will accomplish your goals and meet price targets.

7. Monitor the plan and modify it as necessary based on current information. Once you have written a production-marketing plan, you can design specific actions (strategies) to implement the plan. The strategy defines the mechanics for production, costs of production, marketing costs, product prices, and other variables to determine their impact on potential profits. The plan can be altered as these factors and variables change.

Paul H. Gutierrez, Assistant Professor and Extension Farm-Ranch Management Economist, and
Norman L. Dalsted, Associate Professor and Extension Farm-Ranch Management Economist, Colorado State University, Fort Collins, CO

The Process

The discussion that follows develops a production-marketing plan for a commercial cow-calf ranch in northwestern Colorado. Each step of the production-marketing plan highlights important points but, for the purposes here, the example is simplified and does not include all marketing management and production strategies that would be possible.

Step 1: Assess Production-Marketing Status and Goals. A production-marketing plan is basically an outline—a road map for the operation of the farm, ranch, or feedlot business. The production-marketing plan defines the business—resources, inputs, outputs, and management skills that are available. It summarizes in writing what you have to work with.

Consider, for example, a ranch in northwestern Colorado, which we will call the J/J Ranch. Elevation on the J/J Ranch varies from 6,200 feet at the south border of the ranch to 6,800 feet on the north. The topography is flat and rolling. Soils are composed mainly of sands and clays. Average precipitation is 10-12 inches. The J/J Ranch encompasses 1,860 deeded acres, 20,000 acres leased privately, and 20,000 acres of Bureau of Land Management lands. All acres are rangeland except for 30 acres around the headquarters and 450 acres of irrigated alfalfa hay. Average stocking rates are one animal unit per 80 acres for all rangeland.

The J/J Ranch operation includes 372 English cross-bred cattle. Performance-tested Gelbvieh bulls are used on the mature cow herd. Angus bulls, selected for growth and calving ease, are used on the replacement heifers. The long-term objectives are to have a mature cow that is one-half Gelbvieh and one-half Angus. For replacements, heifers

are retained at approximately 15 percent of the base herd.

The Gelbvieh-Angus crossbred cattle on the J/J Ranch generally attain fall calf market weights of 480-500 pounds per animal for heifer calves and 500-520 pounds for steer and bull calves. Calves are either sold in the fall or retained and fed under feedlot conditions in eastern Colorado, depending on a careful enterprise analysis—costs of production, breakeven prices, and asking prices—and on market outlook and forward-pricing alternatives. The J/J Ranch's short-term production-marketing goal is to optimize production and maximize net return per cow.

Step 2: Perform Market Analysis. There are two basic approaches to price analysis, commonly referred to as fundamental analysis and technical analysis. Fundamental analysis is concerned with supply and demand considerations such as physical stocks of grain, projected crop and livestock production, inventory reports, and federally-inspected slaughter of livestock for specified periods of time.

Technical analysis, on the other hand, utilizes various types of charts, trading volume, open interest, and mathematical formulas in forecasting the price behavior of commodities. The bullish or bearish bias of a pure technical analysis is concerned with the psychology of the market rather than its supply and demand factors.

Many buyers and producers utilize fundamental or technical concepts, or both, with a high degree of reliability, so that it may be worth taking the time to learn enough to be able to "talk shop" with buyers and sellers. Most important, be consistent with your market analysis and/or source of market analysis information.

The J/J Ranch utilizes both fundamental and technical market analysis information. The ranch relies on private and public sources for market analysis information. The J/J Ranch market analysis objective is to formulate reasonable market price expectations for the fall calf market and subsequent feeder cattle markets. These price expectations are evaluated for production and market risk using projected breakeven and asking price estimates of fall and retained ownership production-marketing alternatives. Fundamental and technical factors are monitored closely, as possible marketing dates or forward-pricing alternatives approach.

Step 3: Determine Production-Marketing Alternatives. The enterprise budget provides the format and data needed to assess various alternatives, as well as the timing of the decisions. Several budgets can and should be built for each enterprise (commodity) to represent alternative combinations of inputs and outputs. The profitability of production-marketing alternatives may vary in time as prices of inputs and products change. Input data, production assumptions, market prices, and net return values used in budgets should be changed to reflect the latest information and producer goals.

The J/J Ranch updates enterprise budgets quarterly to determine the breakeven prices for steer and heifer calves, cull cows, bulls, and yearling cattle. The breakeven analysis is then used to establish asking prices for livestock.

Table 1 illustrates a method for determining breakeven prices to cover total direct cost per class of livestock for the J/J Ranch, based on budgeted levels of production, expected market prices, and costs of production.

The importance of enterprise and breakeven price analysis in developing a production-marketing plan cannot be overemphasized. Determining breakeven prices for a commodity provides important information when analyzing profit potential for different production-marketing strategies. Various levels of production and cost can be evaluated for an optimistic and pessimistic outlook for prices. By studying various combinations of breakeven prices, the manager can form reasonable expectations of the chances of obtaining a target price and market weight combination that will cover cost.

Step 4: Set Price and Profit Goals and Target Prices. Price and profit goals and necessary target prices are an important, but often overlooked, component of the production-marketing plan. When and how to sell will be difficult to determine if a producer does not know what price to ask for a commodity. A producer's asking price should depend on management objectives and production relative to cash operating (variable) costs, fixed costs, noncash costs, the amount of family expenses, and the producer's profit goal. In deriving an asking price, a manager must develop the information that is needed to calculate potential net returns based on future price expectations.

Table 2 reports asking prices for each cost category (per cow) and each class of livestock in the cow-calf enterprise on the J/J Ranch. A cumulative cost is determined by adding the total cost per cow for each cost category to the previous costs category. (For example, the cumulative total for noncash costs would be \$379.58 per cow—that is, \$245.51 variable cost plus \$121.98 fixed cash costs plus \$12.10 noncash cost.) For feeder steer calves to cover their

Table 1. Breakeven Prices to Cover Total Direct Cost Per Class of Livestock, 1989 Projected, J/J Ranch, Northwestern Colorado

Column **1** **2** **3** **4** **5**
R
O **Enterprise: Cow/calf—J/J Ranch**
W **Year: 1989 Projected**

I. Percent of costs allocated to each livestock class

Livestock description	Number of head marketed		Average market wt. per hd.		Estimated marketing price	Total expected revenue	% of Costs allocated to each class
1. Steers	(190	x	5.26	x	100.00	÷ 167,434	= 59.69%
2. Heifers	(115	x	5.00	x	95.00	÷ 167,434	= 32.62%
3. Cull cows	(24	x	10.31	x	45.00	÷ 167,434	= 6.65%
4. Cull bulls	(2	x	17.00	x	51.00	÷ 167,434	= 1.04%

II. Total costs allocated to each class of livestock

Livestock description	Total Costs per cow (hd)		% of costs by class (I, Col. 5)		Total costs per class
5. Steers	245.51	x	59.69%	=	146.54
6. Heifers	245.51	x	32.62%	=	80.10
7. Cull cows	245.51	x	6.65%	=	16.33
8. Cull bulls	245.51	x	1.04%	=	2.54

III. Production per cow by class of livestock

Livestock description	Number of head marketed		Average mkt. wt. per hd.	Number of cows	Production per cow
9. Steers	(190	x	5.26	÷ 372	= 2.69
10. Heifers	(115	x	5.00	÷ 372	= 1.55
11. Cull cows	(24	x	10.31	÷ 372	= 0.67
12. Cull bulls	(2	x	17.00	÷ 372	= 0.09

IV. Breakeven price per class of livestock

Livestock description	Total cost per class (II, Col. 3)	Production per cow (III, Col. 4)	Breakeven price per class
13. Steers	146.54	÷ 2.69	= 54.55
14. Heifers	80.10	÷ 1.55	= 51.82
15. Cull cows	16.33	÷ 0.67	= 24.55
16. Cull bulls	2.54	÷ 0.09	= 27.82

Table 2. Asking Prices for Each Class of Livestock in the Cow-Calf Enterprise, 1989 Projected, J/J Ranch, Northwestern Colorado

Column R O W	1	2	3	4	5
	Enterprise: Cow/calf—J/J Ranch Year: 1989 Projected				
Cost item	Cumulative subtotal		% of costs allocated to each class	Production per cow	Asking price (\$/cwt)
I. Livestock class: Steers	Expected market weight: 5.26 cwt				
1. Variable costs	(245.51	x	59.69%)	÷ 2.69	= 54.55
2. Fixed cash costs	(367.49	x	59.69%)	÷ 2.69	= 81.65
3. Noncash costs	(379.58	x	59.69%)	÷ 2.69	= 84.34
4. Family living 14,400/year	(418.29	x	59.69%)	÷ 2.69	= 92.94
5. Profit (30/year)	(448.29	x	59.69%)	÷ 2.69	= 99.60
II. Livestock class: Heifers	Expected market weight: 5.00 cwt				
6. Variable costs	(245.51	x	32.62%)	÷ 1.55	= 51.82
7. Fixed cash costs	(367.49	x	32.62%)	÷ 1.55	= 77.57
8. Noncash costs	(379.58	x	32.62%)	÷ 1.55	= 80.12
9. Family living 14,400/year	(418.29	x	32.62%)	÷ 1.55	= 88.29
10. Profit (30/year)	(448.29	x	32.62%)	÷ 1.55	= 94.62
III. Livestock class: Cull cows	Expected market weight: 10.31 cwt				
11. Variable costs	(245.51	x	6.65%)	÷ 0.67	= 24.55
12. Fixed cash costs	(367.49	x	6.65%)	÷ 0.67	= 36.74
13. Noncash costs	(379.58	x	6.65%)	÷ 0.67	= 37.95
14. Family living 14,400/year	(418.29	x	6.65%)	÷ 0.67	= 41.82
15. Profit (30/year)	(448.29	x	6.65%)	÷ 0.67	= 44.82
IV. Livestock class: Cull bulls	Expected market weight: 17.00 cwt				
16. Variable costs	(245.51	x	1.04%)	÷ 0.09	= 27.82
17. Fixed cash costs	(367.49	x	1.04%)	÷ 0.09	= 41.64
18. Noncash costs	(379.58	x	1.04%)	÷ 0.09	= 43.01
19. Family living 14,400/year	(418.29	x	1.04%)	÷ 0.09	= 47.45
20. Profit (30/year)	(448.29	x	1.04%)	÷ 0.09	= 50.80

proportionate share of variable, fixed-cash, and noncash costs, the asking price must be no less than \$84.34 per hundredweight.

With asking prices broken down by components, the producer is in a position to make logical marketing and pricing decisions.

Step 5: Evaluate Pricing Alternatives. In addition to deciding when to sell, many crop and livestock producers must also consider the question of when to price livestock. The decision to forward price is generally based on (1) understanding of forward-pricing alternatives, (2) price and profit goals, (3) production cost data—that is, analysis of available production-marketing alternatives to reach those goals—and (4) market risk.

Hedging, options, and forward contracting are three methods of forward pricing that can be used effectively to reduce market risk. By hedging, options, or forward contracting, the producer can expand the time period in which to make the pricing decision.

Forward pricing alternatives are not without costs and shortfalls; but a close look at production costs and pricing options and the appropriate alternative can make marketing strategies more effective.

Step 6: Compare Production-Marketing Alternatives. The notion of “marketing decisions” implies that there are at least two marketing alternatives to select from. For example, when considering alternatives to fall calf sales, the J/J Ranch makes a three-way comparison: fall sale, wintering, and backgrounding. And in the interest of risk management, the J/J Ranch makes the three-way comparison for varying levels of market weights and costs of production. Such a comparison shows nine

possible outcomes for the three marketing alternatives.

The asking price for wintering or backgrounding calves reflects the sale price necessary to cover the cost of the feeding program to get cattle to an expected market weight.

Step 7. Monitor Your Plan. Once the production and marketing analysis is complete, with a decision on when to market and when to price, some difficult decisions still remain. The producer’s production-marketing strategy should realistically examine the probabilities of price change to determine when early marketing or delay is the more profitable alternative.

Preliminary market analysis, developing production-marketing strategies, and setting price and profit goals is the fun part. The work begins when the production-marketing decision is made and the plan is implemented. Regardless of the time and effort spent analyzing production-marketing strategies, the future rarely turns out as planned.

That is why it is essential to monitor a production-marketing plan. The producer should be in a position to rationally respond, rather than react, to a market situation. To be in a response position, the J/J Ranch regularly monitors its budget estimates to determine if the plan is on track. The J/J Ranch utilizes a monthly cash-flow budget that provides a useful format for monitoring the monthly cash-operating expenses associated with a particular production-marketing plan. An actual enterprise budget is also completed as the production year progresses and is compared to the predicted budget. With current budget information, the producer is better able to respond to a change in the production, costs, or marketing situation.

Gaining Control

The production-marketing plan is part of the producer's management and control process. The planning process represents the producer's integrated production, marketing, and financial decisions.

Marketing and production decisions should not be made without considering financial goals. Production and marketing decisions should be evaluated in terms of their impact on the financial position of the business. Production, marketing, and financial management decisions are integrated management decisions and should be evaluated as such.

Choosing a Business Structure for Your Farm

A business entity is the legal structure under which a farm or any business is organized and operated. Family farm owners can establish their businesses as sole proprietorships, partnerships, or corporations. Whether a family buys, inherits, or receives a farm through gifts, the family must decide on the type of business structure it wants for the farm. Moreover, the selected structure often changes as the farm grows or new individuals enter the business. Individuals who originally owned and operated their business as a sole proprietorship, for example, may choose to shift to a corporation, a partnership, or a multiple business organization.

The sole proprietorship is the most common form of business organization since most small businesses are owned and operated by a single individual. Sole proprietorships have a common law origin and can be easily established and operated because the business structure is an extension of an individual's rights and responsibilities in property ownership and commercial transactions. Partnerships also have a common law ori-

gin, and thus have many of the characteristics of a sole proprietorship.

By contrast, incorporation has a statutory origin, which means State laws prescribe a corporation's structure, procedures, and conditions of organization and operation. Hence, incorporating a farm business requires a series of legal steps, and corporate activities are closely regulated.

Choosing an Organizational Structure

Sole Proprietorship. Personal and business objectives help decide the best organization structure for a small business. The sole proprietorship is usually best suited for a beginning business because it is the simplest and least regulated of all business types. No legal papers must be filed to establish and maintain the business. Since the proprietor owns and operates the business as an individual, records and planning are limited to those needed to reach management objectives, to file personal income tax returns, and to comply with laws and regulations common to all

Ralph E. Hepp, Extension Economist, Department of Agricultural Economics, Michigan State University, East Lansing, MI

business ventures. The major drawback is that sole proprietorships, unlike some types of corporations, do not offer protection from personal liabilities.

Although the sole proprietorship is the simplest business structure, financial management considerations and family objectives may make this structure inappropriate as an enterprise becomes larger and more complex. The advantages of partnerships and corporations over sole proprietorship are too complex to warrant broad generalizations. The decision to shift to a new business structure must be made on a case-by-case basis. Each farm owner must decide if and when to move to a more complex and formal organizational structure.

Multiple Ownership. Increasing capital requirements and the economies of scale available to large operations led to the evolution of multiple ownership of agricultural enterprises. Increased capital requirements make it difficult for young people to start their own enterprises, and many young people enter into the ownership and management of their parents' businesses.

However, parents usually choose not to sell all of their assets at once to the children. In any case, the children usually cannot afford to purchase the entire farm operation at one time. The assets are usually transferred gradually between generations. In these situations, a multiple ownership structure enables the younger generation to move slowly into ownership and management while the older generation gradually withdraws.

Because a sole proprietorship is, by definition, organized and operated by one individual, the intergenerational transfer of a business over time requires

a business organization that accommodates multiple owners—either a partnership or a corporation. In some cases, separate proprietorships—with joint ownership of equipment and labor exchanges—may be established between parties. Separate proprietorships may be more feasible for some enterprises because of their large capital investment in facilities and equipment.

Shared Management

A large business with multiple owners, whether a partnership or a corporation, offers a chance to divide management responsibility among the partners or stockholder employees. Joint management decisionmaking provides excellent on-the-job management training for less experienced managers. Partnership and corporate structures are equally flexible in the development of a management team that meets the needs of each business.

Income Sharing

Multiple ownership and management in a partnership or corporate structure offer many avenues for distributing income among the respective parties. A partnership pays no income tax because the individual partners assume their own tax liabilities; thus, income can be shared through drawing accounts and distribution of residual income. If partners lease assets to the partnership, lease payments can compensate owners for their resources.

The corporate structure can distribute income among stockholder-employees in the form of salaries, dividends, or interest on debentures. Payments to stockholders must be reasonable and based upon services rendered, but there is much flexibility in sharing income among stockholders and employees.

Capital Transfer and Estate Planning

Capital transfer among common property owners in a partnership or corporation is a significant consideration when family members have decided to continue the enterprise as an operating unit beyond the retirement of the present owners. With proper planning, the partnership and corporate structure can be used to reserve resources for retirement, transfer property to family members, and minimize expenses and transfer taxes.

Regardless of the business structure—be it sole proprietorship, partnership, or corporation—it is possible to develop a sound estate plan. The capital transfer through the estate can be handled with jointly held property ownership, wills, and trust arrangements. Although the partnership or corporate structures do not in themselves solve estate transfer problems, they can make capital transfer somewhat easier.

The costs associated with the transfer of property from one generation to the next include Federal estate and gift taxes and State inheritance taxes. Transfer of property by gift is one way to minimize the death tax burden. Federal gift tax laws allow a person to make \$10,000 of outright gifts to each beneficiary each year without paying a Federal gift tax. The annual gift tax exclusion can be doubled to \$20,000 if the gifts are made by a married couple to a third person even if only one member of the couple owned the property.

Another advantage of transferring capital as a gift is that gifts are valued at the time they are made. If appreciating assets (such as real estate) are held until death, the value of the asset may have increased, causing an increased death tax liability.

Buy-sell agreements are often used to help transfer capital ownership of a partnership or corporation from one business associate to the next. Such an agreement can establish a market for the business assets when owners desire to withdraw from the business either during their lifetimes, at death, or upon becoming disabled. This is accomplished by requiring the remaining partners or stockholders to purchase the ownership interest of the departing member; likewise, the business associate or the estate is required to sell to the remaining owners. The contract normally specifies either an actual purchase price or a procedure to follow in determining the price.

Attracting Capital

The traditional sources of capital for small farms are the equity provided by family members, reinvestment of retained earnings, lease agreements, and loans. Capital sources are the same regardless of the organization's structure. The sole proprietorship may be the most limited in terms of capital acquisition because only one family is involved in the operation. Multiple ownership through a partnership or corporation allows the combining of funds from more than one family, which results in a larger business.

Federal Income Taxes

A sole proprietor's business pays no Federal income tax. Instead, the taxable income of the business is included in the proprietor's personal income, and taxes are paid at the individual tax rates. Federal income taxes for a partnership are treated in a similar manner. The partnership files an information return showing the income and expenses, the names of the partners, and how the part-

nership earnings will be divided among the partners. The profits, losses, capital gains and losses, and tax credits are allocated to partners according to the terms of the partnership agreement. The partners pay taxes as individuals on their respective shares of partnership income.

Federal income tax savings may occur if a business incorporates and becomes subject to Federal income taxation under Subchapter "C" of the Internal Revenue Code. Because a corporation is considered a separate taxpayer, the corporation can divide income among the corporation, owner-operator employees, and shareholders. The corporation pays individuals associated with the corporation for their contributions—owner-employees receive a salary for their labor, and management and shareholders receive dividends for their capital investment. Residual income after all expenses are paid is taxed to the corporation at corporate income tax rates. Whether Federal income taxes will be lower after incorporation depends upon the corporation's earning level, the tax rates for individuals versus that for corporations, and the allocation of earnings.

When the corporation is owned primarily by a family, the tax objective is to minimize the family's total annual income tax burden. This means that the total taxes paid by the corporation, in addition to the personal income taxes paid on the stockholder-employee's salary, and any other personal income should be less than the total personal income taxes paid by the owners before incorporation.

This type of tax reduction can be accomplished by equalizing the rates at which income of the corporation is taxed versus that of the individual stockholder-employees. Normally this is done by adjusting the salary of major em-

ployees and/or by adjusting lease or rental rates of assets (primarily real estate) owned by stockholders.

But these adjustments cannot be made arbitrarily. Salaries must be established at the beginning of each corporate fiscal year. They cannot be increased or decreased within the year to reflect changes in the financial success of the business. However, considerable flexibility can be achieved by establishing a bonus or profit-sharing agreement based on either the production or the income.

Another tax advantage of incorporation is the increased business deductions available because the owners who work for the corporation become employees of the corporation. In addition to the employee's salary, the corporation can take a deduction for fringe benefits such as group life insurance plans, medical and hospital plans, pension and profit sharing plans, and others. It permits the corporation to use pre-tax dollars to pay for benefits received by a stockholder which the same individual not in a corporation would acquire by using after-tax dollars. This results in more after-tax total income available to the stockholder-employees.

A disadvantage of Subchapter "C" corporations is that double taxation is possible. It occurs when corporations pay dividends to their shareholders. Dividends are distributed from the corporation's after-tax income and shareholders must include dividends in their taxable income. Thus, shareholders are in effect paying taxes a second time on the same profits.

If a corporation elects to be taxed under the special tax option or Subchapter "S" method, the corporation is not a taxpayer for income tax purposes. That is, the corporation itself is not taxed on any income. The income of the corpo-

ration “flows through” to the shareholders and each shareholder pays a tax on the individual’s prorated share of the corporation’s earnings when filing an individual income tax return. All income is taxed the year it is earned whether or not it is retained or distributed. Subchapter “S” rules are similar to partnership rules in that an information return is filed annually on behalf of the corporation.

Thus, corporate earnings in a Subchapter “S” corporation are taxed only once—to the shareholder. This avoids the double taxation possibility present with Subchapter “C” corporations.

However, just because Federal income taxes may be reduced by incorporation, not all taxes and costs will necessarily be reduced. Rather, there are a number of increased costs and taxes present with corporations. All of these must be examined in arriving at the total savings possible by incorporation.

Payroll Taxes

After incorporation, the sole proprietor or partner changes status from employer to employee. Therefore, after incorporation the business has at least one additional employee, if not more, which results in increased payroll taxes.

Social Security taxes are increased since the combined employee and employer rates under the corporate structure are higher than for self-employed individuals (partners or sole proprietors).

Stockholder-employees of corporations are also subject to Worker’s Compensation charges on their salaries and are entitled to benefits under the Act. This is not true of sole proprietors or partners in a partnership. A stockholder-employee’s salary may also be subject to the unemployment compensation tax.

Another disadvantage to owner-operators of farms after incorporation is that personal income taxes must be paid through quarterly estimates or withholding, rather than as a lump sum on March 1 as permitted by self-employed individuals. A farm corporation employee is not a “farmer” for this purpose. A farm employee must file a declaration of estimated tax and make quarterly payments or have Federal income taxes withheld from the salary.

Structure Must Fit Objectives

The initial business organizational type for a small-scale family business is usually a sole proprietorship. When circumstances surrounding the operation suggest a partnership or corporation, an in-depth analysis needs to be made. An analysis of the organizational characteristics and the objectives of the family is perhaps the most important, but still the most neglected, phase of the process.

Usually there is no need to hurry the decision. It is a relatively easy and inexpensive process to incorporate or form a partnership, but it may not be so easy and inexpensive to dissolve the corporation or dissolve a partnership. Thus, if you are thinking about changing business organization, be sure to take enough time to weigh the advantages and disadvantages of each structure for your particular situation.

The Flickerville Mountain Farm and Groundhog Ranch: An Apprenticeship

All right. You've bought the farm, so to speak, and you're ready to become your own boss, set out to make a comfortable income in the inspiring solace of the bucolic countryside. Free at last.

A good start, but you've already bumped up against the first rule of Beginning Farming 101. To wit, don't count on making a comfortable living, at least at the outset. The second rule: your days of "freedom" are over, because the farm is a demanding, dominating taskmaster. And the third rule: brace yourself for failures and frustrations because there will be many.

This is the story of the Flickerville Mountain Farm and Groundhog Ranch, a small organic fruit, vegetable, and flower operation in south-central Pennsylvania—far enough from the big city to provide the solace, yet close enough to assure marketing possibilities.

The first three rules of beginning farming, as well as dozens more, have been written in bold face and learned in painful ways by the two newspaper reporters who started Flickerville Moun-

tain Farm in 1983. From the start, the idea was to make the farm into a self-supporting unit. But despite extensive gardening experience, neither of us neophyte farmers had the slightest notion of what we were getting into.

Our knowledge was scant, our naivete massive, our bodies unprepared for the bone-crushing fatigue that would dog us. Our psyches were not ready for the hurtful shock of such vagaries of nature as ongoing drought, occasional hail, and unexpected frost. But we endured, inspired by the example of others who had made it and buoyed by a belief that our farm could, in time, pay its way and provide a modest living for its owners.

Over the first 5 years, the farm expanded from a large garden to 15 intensively planted acres, producing more than 70 varieties of fruits and vegetables and several dozen kinds of flowers. Almost all of the farm's output is sold 100 miles away in the Washington, DC, area—at farmers' markets, in custom-packed bags to about 100 consumers in

Ward Sinclair, former *Washington Post* Agriculture Reporter and Co-owner, with Cass Peterson, of Flickerville Mountain Farm and Groundhog Ranch, Dott, PA



Customers at a Washington, DC, farmers' market enjoy farm fresh products from the Flickerville Mountain Farm and Groundhog Ranch in Pennsylvania. (USDA Photo by Larry Rana, 89BW1031-17)

a large office building, and to restaurants and stores through a cooperative formed with half-a-dozen other Pennsylvania organic growers.

Learning the Rules

The Flickerville Mountain Farm is not yet an overwhelming success, but it has grown with enough promise that one of the partners gave up his city job in 1988 to work the farm full time, with the other partner not far behind. Ours is a story of rules being learned, then broken right and left, and learned again. It is also a story that provides some insights into the importance of "management," a term that really means "keeping an eye on the ball."

One central key to this farm's limited success is management. Texts and

treatises by experts generally are clear enough in their cautions about beginning farming. But none of these substitutes for the hard-knocks knowledge gained from hands-on experience; none seems to adequately stress the critical importance of daring to take risks, of carefully allotting time to farm tasks, and of constantly discussing every facet of the enterprise.

At the outset, for example, it was clear that the first problem at Flickerville Mountain Farm would be time. We lived and worked more than 100 miles away from our property. That meant our farming would be restricted to week-ends, vacations, and off-days. That meant also that while we were thinking big, we had to farm small. And it meant that our newspaper jobs, at least into

the foreseeable future, would have to help the farm pay for itself.

The Plan

Given that dilemma, one of the first things we beginning farmers did was draw up a 5 year plan intended to help us achieve our goal of a self-supporting farm. It was an ambitious plan in some ways, but we were realistic in understanding that to fulfill the plan, the farm would have to expand each year and the physical demands on the owners would increase exponentially.

The plan was drafted in a way that called for avoiding debt as much as possible, using the off-farm income to finance the gradual acquisition of equipment and material. Because of our often obsessive zeal—an important ingredient, by the way—each of the plan's incremental goals was met. "The plan," as it became known, was the central focus of virtually every discussion about the farm's operation.

As the plan dictated, income from sales doubled each year. This meant growing more crops, tending more land, trying more varieties, and paying greater attention to marketing. In accordance with this blueprint, we acquired small equipment first—a rototiller, hand tools, a backpack sprayer, a couple of wheel hoes. As expansion occurred, again according to the plan, we added larger equipment including a diesel tractor, a rotovator, a rotary mower, a plastic mulch-laying machine, a commercial-size van, a manure spreader, a tank sprayer, and a cooler.

In hindsight, we unknowing amateurs would make only two major revisions in our plan. Instead of waiting until the fourth year, we would have acted earlier to erect a greenhouse and to install a drip irrigation system. The greenhouse, although it meant a whole new

range of managerial details, allowed us to save money and augment income by growing our own transplant seedlings and offering bedding plants for sale. The drip system, made mandatory by droughts in 3 of the first 4 years, quickly paid for itself after it was installed in time to avoid a wipeout in the Big Dry of 1988.

Reasonably successful attainment of "the plan" was not the end, however. A second 5-year plan, with new goals, was drawn up. The plan envisioned a second greenhouse and a walk-in cooler, both to be built by the farmers; a larger truck to haul goods to market; and a structure for storing and processing dried flowers and herbs into wreaths and other high-value decorative items. The plan included the possibility of adding a small kitchen that could increase earnings by converting farm produce into value-added items such as organic pesto, pickles, herb mixes, sauces, and preserves.

Although not cast in concrete, the new plan represents goals and ideas—concepts born mostly during endless nocturnal discussions over the kitchen table. The thrust is to seek enough diversity that the farm's fortunes will not rely on a few crops. It looks toward a time when perhaps the farmers can devote less of their energies to marketing activities that now require driving upwards of 900 miles a week during the growing season. It envisions providing work for a few more nearby residents in an area in where jobs are scarce.

Down to Basics

Every farm, of course, is different. But some of the experiences at the Flickerville Mountain Farm and Groundhog Ranch (a name chosen to lure and amuse farm-market customers) may have universal application for be-

ginning farmers, particularly those who intend to grow specialty crops. After Rules 1, 2, and 3, these are some of the other basics:

- *Focus:* If the farm is to be more than a hobby or a retreat, decide on your focus and don't overreach. Start slowly, as though undertaking an apprenticeship, and pay attention to details. Grow a few varieties—things that are likely to find a ready market—and learn to grow them well. Remember that a cow is more demanding than a carrot. Unless you live on the farm, are near enough to provide regular attention, or have hired labor, it's probably best to not even think about livestock.

At Flickerville Mountain Farm, the first year's crop focused on sweet basil and a few other fresh-cut herbs that grew well and sold quickly. That led to a wholesale contract to expand production and a decision to go to a weekly farmers' market with more items.

- *Plan:* Once you've settled on a focus, draw up a plan for the enterprise. The plan can, and probably should, be flexible. But it also should cover at least several years, simply because successful farming rarely happens quickly. The plan should be reasonable, geared to your financial reality, and yet demanding in that it forces you to keep reaching for the final goal.

At Flickerville Mountain Farm, the plan covered the first 5 years, but details were changed from time to time as events dictated. As markets and production possibilities became apparent, flowers—fresh-cut and for drying—were given higher priority in the plan.

- *Manage:* First, boss yourself mercilessly. Figure out your priorities in terms of work that must be done and stay after yourself until the task is completed. Discuss and set priorities with a partner, if you have one. Divide areas

of responsibility, according to who does what best or most readily. Make regular task lists based on the priorities and then cross off each item as it is completed—a helpful step in giving you a sense of progress and accomplishment.

At Flickerville, I operate and repair most of the mechanical equipment and oversee soil preparation and improvement. My partner manages the greenhouse and flower operations. I maintain books and records; she is in charge of fruit tree maintenance and pest control. We divide planting, harvesting, and marketing duties, seed and plant purchases, and general grunt work.

- *Scrimp:* Modern agriculture is strewn with examples of farming enterprises that failed because of inadequate financing or excessive debt, or lack of fiscal conservatism. So be miserly in the extreme—avoid debt and pay as you go whenever possible; save everything from lumber and nails to wire and plastic jugs. They always have a use.



The Flickerville Mountain Farm greenhouse keeps part owner Cass Peterson busy with transplant seedlings and bedding plants. (USDA photo by Larry Rana)



Ward Sinclair harvests one of the many types of lettuce offered by the Flickerville Farm. This row shows tomatoes and lettuce being grown together. With the lettuce harvested, the tomatoes have plenty of room to develop on the plastic covered rows, eliminating the need to stake the tomato plants. (USDA photo by Larry Rana)

The Flickerville debt is limited to the farm mortgage and payments on the tractor and the van. All other equipment, fruit and Christmas trees, and perennial plants were cash purchases as money became available. Lumber from dismantled chicken houses was recycled into board fences, and castoff telephone cable spools became irrigation hose holders. Old motor oil goes into tool-cleaning buckets or is used to treat fenceposts.

- ***Clockwatch:*** Time, or lack of it, is always a critical factor on the farm. It is even more important to the part-time farmer. So look for ways to economize on time; look for shortcuts that make the tasks easier and quicker; and avoid duplication of effort.

At Flickerville, extensive use of black plastic mulch reduces the time needed for weeding and cultivation; some crops are bagged or boxed in the field to avoid travel time and double-handling; harvesters separate the different grades of produce in the field to avoid an extra step at the packing shed.

- ***Study:*** Knowledge is just as critical as time, so become a relentless student of what you are doing. Pay attention to the ways of other farmers, visit other farms and ask questions, and read everything you can get your hands on. Between the Extension Service, Federal and State agriculture departments, land-grant universities, and private presses, a multitude of farming information is available. Mine these sources.

We have accumulated a large library of useful material—old horticultural how-to books, old USDA yearbooks and other farming bulletins, and vegetable-growing guides. We attend winter workshops and pester our farming friends with questions about growing techniques and problems.

- ***Dare:*** Farming is a high-risk business to begin with, but you must dare to challenge the conventional wisdom from time to time. The experts, for example, warn that you should grow nothing unless you have a market for it. Not so. As your enterprise expands, grow a few things each year that will be new to your customers and give you a marketing edge on your competitors.

On a whim 4 years ago, the Flickerville farmers planted purple cauliflower. It proved so successful and so lucrative that it is now a fall standard for us. This year's new market introductions included gold beets, bi-colored beets, black Spanish radishes, and leeks—all of which sold like hotcakes. The year before, it was corn salad, fancy French lettuce, and the lisianthus flower. The results were the same.

No market surveys, no opinion polls, no questioning of the experts. Just a sense that something different would sell at a farmers' market was enough to make it work. That's what apprentices are for.

Operating a Pick-Your-Own Strawberry and Pumpkin Farm

In 1984, our family moved to the Bellevue Berry Farm, just south of Omaha, Nebraska. The farm covers less than 100 acres—50 acres are irrigated and 20 remain woodland. Over one-third of Nebraska's population lives within a 25-mile radius of the farm, which makes it an ideal location for a pick-your-own berry operation.

Before heading to Nebraska, my wife Kathy, our sons Tyson and Zach, and I lived on a 214-acre farm in Maryland. Weekdays I commuted over 3 hours round trip daily to Washington, DC, where I worked as an agricultural economist for the U.S. General Accounting Office, analyzing food and agriculture policy for the Congressional Agriculture Committees. We had 65 head of beef cattle and ran a 5-acre pick-your-own strawberry operation. I farmed in the evenings and on weekends. My good-paying job helped us weather the mistakes we made as beginning farmers, economic crunches (such as the gasoline crisis), and unpredictable weather.

After much discussion, we decided to move west to be near my family. We put the Maryland farm up for sale, and

to my surprise, it went quickly. Then we held an auction and sold all but our most prized possessions—which included our specialized strawberry equipment (including one Cub and two Super A International Harvester tractors with cultivators and a mist blower). Keeping the strawberry equipment required us to make five round trips between Maryland and Nebraska, with friends helping us on the cross-country treks. The hardest part about moving was leaving our friends—and for me, leaving my beef herd.

Our First Crop

We knew that a close-in location would be critical to the success of a pick-your-own operation. We formed a family partnership and purchased prime Nebraska bottom land near Omaha. The soil is excellent, well-drained, and moderately sloping. The climate is subhumid continental, with cold winters and summer temperatures in the 80's. The average annual precipitation is about 30 inches. But even though the land and the climate were close to ideal, the first year was far from easy. With no barns, roads, or other infrastructure, we not

Edward A. Schaefer, Bellevue Berry Farm, Omaha, NE

only had to plant a crop, but we also had to build. Priorities had to be set. Our first tasks were to plant and to establish an irrigation system. We constructed buildings during the off-season.

Because of our experience with strawberries in Maryland, we had chosen strawberries as the main crop on our new farm. During one of our first trips west in early May, my brother Jeff rounded up a crew and we planted 30 acres of strawberries—it seemed like a sea to us. To establish our fields, we used certified virus-free plants, which are winter hardy and show some resistance to soil disease.

We had planned to make our final move west in mid-June, immediately after we finished our last strawberry harvest in Maryland. But it took us longer than expected to complete the farm sale, and we did not arrive in Nebraska until early July. By that time, the sea of strawberries we had planted in early May was awash in knee-high weeds—the result of a wetter than usual spring. After two hard weeks of mowing, cultivating, and weed pulling, we saved our plants. The next step was to put in an irrigation system.

Establishing an Irrigation System

Strawberries require irrigation, not only to promote optimal growth but also to protect the buds, flowers, and fruit from freezing. We use 8-inch round and 6-inch round aluminum main lines; our lateral lines are less expensive 2½ inch PVC pipe. Lateral lines are set down each 16th strawberry row, (our strawberries are on 40-inch row centers) providing a sprinkler every 50 feet by 40 feet. We also use the irrigation system for spraying fungicides and water-soluble nutrients. During harvest, if the temperature climbs above 85 degrees,

we use the irrigation system to hydro-cool our strawberries. We run the sprinklers for 15 minutes every hour, up to four times each day.

I also use the irrigation system to protect the strawberries from frost. Any time the air temperature drops close to 33 degrees, I start my irrigation pumps and run them until the threat of a freeze is over. During frosts, we pump up to 1,500 gallons of water per minute onto the fields from a nearby creek and pond (which we dug and filled with water from the creek). Water freezes around the flower and bud of the strawberry plants and protects the plant tissue from the killing cold air. Heat is given off as the water changes from a liquid to solid ice.

Protecting strawberries from frost requires all-night vigils between April 10 and May 20. We usually have five to eight nights of frost during that period, and up to an inch of ice may cover the ground by morning. On the nights when the temperature hovers around freezing and our irrigation pumps are running, I ride the fields in a 4-wheel Honda all-terrain vehicle, making sure that the sprinklers are operating properly.

Having an irrigation system has enabled us to have good crops regardless of the amount of rain we get—even during the 1988 drought when we had less than 8 inches of rainfall. Irrigation is especially important for us because we cannot obtain crop insurance for strawberries.

Cultivation

Throughout our first summer, strawberry runners were constantly being set through cultivation in order to form a solid row. Cultivation and small amounts of herbicide were used. Once the appropriate number of plants had been established, we cut off the extra

runners so that we created a 12-inch to 14-inch wide band of plants. This left the pick-your-own customer with aisles of at least 2 feet in which to pick.

We use straw mulch to protect the strawberry plants during winter and to keep the berries clean. We mulch the strawberries in early December using 10 large round bales (weighing a total of 5 tons) on each acre. The bales are spread with a machine called a Big Bale Buster Haybuster, which enables one person to handle the entire operation. We have reduced pesticide spraying by mulching properly, keeping the fields free of weeds, and walking the fields every 3 days to check for pests.

Attracting Customers

Having worked all summer and into the fall growing our strawberries, we found ourselves faced with the prospect of marketing our crop. One of our primary goals was to sell everything we grow right at our own farm. But how does one sell 30 acres of strawberries? We focused our efforts on advertising and, when possible, obtaining free publicity. As harvest time neared, we hoped that the magic of the marketplace would work.

While thousands of customers found their way to our farm that season, we learned that trying to replicate a successful farm enterprise is not easy. We had tried to pattern our farm after my brother Jeff's Roca Berry Farm, located 15 miles outside of Lincoln. But our location near Omaha has a much different clientele than my brother's. Customers who come to the Roca Berry Farm are older, more rural people who pick large quantities of berries for freezing and canning. Our customers are mainly younger families with working mothers, who have little time for canning or freezing. Many are Air Force

families who have little freezer space in their homes. Our customers are more interested in recreation and would rather make more trips and pick small amounts for fresh consumption.

We made a critical mistake in not knowing our market. Even though we had many customers that first year, not all of the strawberries were picked. Our yield was excellent, but we sold only about half of the 30 acres we had planted. Seeing all those berries go to waste was difficult. But we refused to get discouraged. I kept 25 acres in production and plowed under 5 acres of my poorest yielding variety. In their place, we planted 5 acres of pumpkins. Kathy began writing to schools in the Omaha area to tell them about our farm, and we were on our way to our next crop.

Learning from Experience

Now, with the experience of four harvest seasons and a better understanding of our customers' needs, we have changed the focus of our farm somewhat. We now grow 20 acres of strawberries—15 as a pick-your-own operation and 5 that we harvest ourselves and sell at our farm market. Even after reducing our strawberry operation by one-third, we still leave too many berries in the field. However, our philosophy is that it is better to have enough produce available for our customers than to have them go home empty-handed. In a pick-your-own operation, you never know how many people will show up.

We have added a walk-in cooler that has greatly enhanced our prepicked business. The cooler has also helped our pick-your-own operation: When customers fill their picking flats, we take the flats to the cooler so the customers can harvest more berries.

Pumpkins have become a bigger focus of our business. We now grow more than 20 acres of irrigated pumpkins. All are sold on our farm, and most are sold right from the fields.

Over the years, we have kept construction costs to a minimum by taking down old barns in the area and reusing the lumber. Roads and parking lots have been constructed by using wood chips and gravel from an abandoned railroad track.

Goals and Philosophy

Today, our primary objectives are to promote superior crop production and to provide our customers with a “family country experience.” We emphasize that our customers are not only getting top quality produce—“quality that can’t be shipped in at any price”—but also a day of family fun in the country.

Our family is crucial to this environment. Since our farm is small, Kathy and I divide up most of the work. I do most of the farming and construction. Kathy handles the advertising, book-keeping, hayride and school trip scheduling, and the thousand other things that must be done on a pick-your-own operation. Our sons work on the farm every day throughout the summer and on weekends during the spring and fall. They help out in the farm market and in the field work.

The Busy Season

The strawberry and pumpkin seasons find our farm transformed. Our operation jumps to 20 or more workers. Summer vacation still comes early in the farm belt, providing us with ample strawberry pickers and field supervisors for our May 25 opening. Tyson, 15, and Zach, 11, along with school friends, make up the majority of our strawberry

help. By maintaining a festive atmosphere each weekend during the summer, we are able to recruit volunteer assistance from friends and family members, who help drive the tractors and work in the farm market.

During the summer, Kathy supervises the farm market and the marketing aspect of the business, while I keep 5 tractors and 7 wagons rolling; oversee the strawberry, broccoli, and pea harvest; and plant the pumpkins and other fall crops. We take time, though, to enjoy the harvest and talk to our customers—which is extremely important.

When the strawberry harvest ends in late June, we cut back the strawberry plants and begin preparing for the fall harvest. As October rolls around, people again begin arriving at our farm in droves. Most of our strawberry customers come back for pumpkins, gourds, squash, Indian corn, apples, cider, popcorn, hayrides, and just plain country fun. Each weekend during October, I roast a hog (one that we raised) and put on an old-fashioned cookout for our customers.

During the week, a seemingly endless line of yellow busses and vans bring young people to the farm—more than 10,000 each season. For the price of \$2.50 for each child, school and scout groups can enjoy an educational hayride to and from our pumpkin patch, where the children pick their own pumpkins and gourds. The children also play at Fort Pumpkin, made entirely of cornstalks, visit with our farm animals in the corral, and have a picnic. Each child receives a coloring poster of our farm.

On these busy summer and fall days, the solitude of the cold, lonely nights when I’m out in the fields protecting the strawberries from frost seems dis-

tant. Now kids in shorts climb endlessly over our play tree and run screaming in delight from our geese in the animal corral.

Using a Computer

Having a computer has greatly simplified our bookkeeping and planning. We have developed a detailed cost accounting system on the computer, which makes it easy to code our checkbooks every quarter. In less than 2 hours of data entry, Kathy and I can see where all of our money went. We used to spend more time than that hypothesizing about what happened.

The computer is also the cornerstone of our farm advertising. During the winter, we use the computer to design newsletters and advertising materials—and to make camera-ready copies. We have developed a mailing list that includes more than 12,000 previous customers—as well as businesses, schools, and scout troops—to promote our spring and fall tours. Our computer program enables us to sort the mailing list alphabetically and by zip code, and to print mailing labels for our spring and fall newsletters.

Starting Your Own Operation

Managing and operating a pick-your-own farm is not for everyone. But if you have a good location, enjoy people, want to be your own boss, and are willing to work 7 days a week rain or shine, you may want to consider it as a possibility. Although many farmers and ranchers may find themselves as I sometimes do—too busy just working to take time out to think—it is crucial for a prospective farm manager to take time to think. Think about what crops will work best for you and think about how

you can cultivate your market and then grow from that experience.

Become more knowledgeable about your crops. Assistance is available from universities in your area, the Extension System, consultants, and producer associations. We are members of the North American Strawberry Growers Association, and we try to attend the association's yearly meetings to keep up with new research and marketing ideas. By being association members, we have also met many other farmers with whom we have exchanged ideas and technical advice.

Do not expect to grow rich quickly. There are too many variables in this type of business. Even if there are no other pick-your-own farms in your area—as was the case with the Bellevue Berry Farm—your operation will not necessarily be an overnight success. It takes time to inform people about your business and spread the word about the benefits of fresh, vine-ripened produce.

Aquaculture: The Fastest Growing Farm Industry

When settlers arrived in this country several hundred years ago, they found a land rich in animals that could be hunted to supply them with food. As more settlers arrived, the wild food supply diminished and the people either had to turn to agriculture or move West into unsettled regions. You know the rest of the story: agriculture soon became our principal source of food.

Today, an analogous situation exists in the world's oceans. Fish have been hunted to the point where we are unable to significantly increase the catch. In fact, since 1975, the world's catch has increased little. This is because most commercial fishing areas have reached their maximum sustainable yield; the catch cannot be increased without reducing the fish population's ability to reproduce and replenish their numbers. In addition, pollution and competition from sport fishing interests aggravate the situation.

Aquaculture, or fish farming, is the only way to make up the deficit and satisfy an increasing demand for fish products. Aquaculture is now the fastest growing agricultural industry in the

United States, increasing by more than 20 percent annually in the 1980's.

Aquaculture is just beginning to have an impact on U.S. fish supplies. In 1986, approximately 620 million pounds of aquacultural products were produced by private operations. The main contributors that year were catfish (327 million pounds), crawfish (98 million pounds), salmon (75 million pounds), and trout (5 million pounds), along with bait fish and tropical fish. The catfish industry has grown rapidly from a total of 3 million pounds processed in 1969 to 16 million pounds in 1975 and 295 million pounds in 1988. (Consumption from live haulers, fee fishing, and direct purchases are not included in these catfish processing figures.)

Commercial production and processing are highly concentrated in Mississippi (accounting for almost 80 percent of production), Arkansas, Alabama, Louisiana, and other southeastern States. In addition to catfish, there are many more species of farm-raised aquaculture products produced for sale in the Nation.

Jerry R. Crews, Associate Professor and Extension Economist, and John W. Jensen, Professor and Extension Fisheries Specialist, Auburn University, Auburn, AL

Case Study: The Gvillos

In 1979, Curtis and ReJeana Gvillo of Moundville, AL, made the biggest decision of their lives—to buy a farm. After finishing college and working 2 years with an agribusiness firm, Curtis had a strong desire to make his living by farming. Having grown up on an Illinois family farm, where the predominant enterprises were soybeans and corn, he was optimistic about making a go of it on the couple's newly acquired farm.

ReJeana, a West Alabama native, had also grown up in farming and shared Curtis' enthusiasm and commitment to make a go of it. The couple purchased a farm from ReJeana's great uncle near Moundville.

During the first couple of years, Curtis tried a variety of traditional enterprises—cotton, soybeans, wheat, corn, and stocker cattle. Although Curtis was on top of his operation from a managerial standpoint, he recognized that financial distress was never far away. ReJeana was also aware of the dilemma. "We were both putting in long hours and cutting living expenses, and Curtis' mother, Dorothy Gvillo, was even pitching in, but things were not improving," ReJeana said. Their production and financial records confirmed their worries.

Seeking an Alternative

Curtis reluctantly admitted that in many of the traditional enterprises, other regions of the country had a competitive advantage. (See Part II, Chapter 9 on competitive advantage.) What could he produce and be competitive with, he asked himself.

Catfish production had crossed his mind; he knew of catfish farmers in the area. They had friends and relatives who produced catfish or worked in the proc-

essing plants. With some skepticism, Curtis began investigating the catfish business. When he asked producers about the requirements for success, it became clear that certain basic ingredients were required: suitable sites for ponds, adequate water supply, available markets, access to capital, and "know-how." The biggest difficulty would be in making the adjustment to aquaculture from the traditional enterprises that he preferred and felt comfortable with. "I knew this was a different ball game," Curtis said.

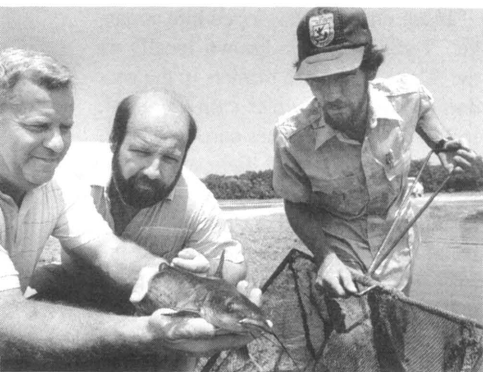
Taking the Plunge

In 1981, the Gvillos built their first catfish pond—covering a 23-acre area. The construction was paid for mostly through the sale of timber from the pond site. But being surrounded by successful catfish farmers doesn't necessarily guarantee success, as the Gvillos soon found out. Curtis admitted that they may not have been serious enough about catfish the first year. After the first crop was sold to a processor, the Gvillos discovered that they had just broken even.

However, Curtis knew what had gone wrong: They had started with fingerlings that were too small. As a result, they sold their fish too early, and many of the smaller ones were rejected as unmarketable. But they didn't make that mistake again. Since then, they have kept their catfish until a profitable price was offered. They never sell before they feed more than two pounds of feed for each fish, thereby guaranteeing that all fish are marketable.

Relationship with Lender

The catfish business, like many other types of farming, is capital-intensive. In addition to the costs for pond construction, operating money required to



At the Tishomingo, OK, National Fish Hatchery, ARS biologist Wendell Lorio (l) and U.S. Wildlife technician Larry Norton (r) examine a catfish with Gary Ainsworth of the Red Ark Development Authority. Created in 1984 by the Oklahoma State government, Red Ark helps farmers grow and market catfish and other crops. (USDA Photo by Bob Bjork, 0887X831-10)

produce a crop of fish can easily be more than \$2,000 per acre. The Gvillos learned a hard lesson about the risk involved in growing catfish. In 1985, Curtis decided to expand his catfish acreage. Rather than building more ponds on his own land, he decided to rent a 25-acre pond that could be put into production. Curtis reluctantly admitted that at that time he believed soybeans would make a comeback and he didn't want to sacrifice any cropland.

After the expense of getting the pond into production, his first crop of fish was doing well—that is, until a few weeks before they were ready for harvest. It was a sad day for Curtis and ReJeana to find an entire pond of fish mysteriously dead.

Curtis had always been up front and businesslike with his banker. He knew arrangements had to be made regarding the disaster. On the drive to the bank the next day, he began thinking the worst—that he would have to liquidate

some of his assets to cover the loss. But to Curtis' relief, his banker was understanding and arrangements were made without disrupting his farming operation. The banker had several other catfish accounts and was aware of the risks involved.

Total Commitment

By 1988, the Gvillos had several years of experience under their belts. They had made many mistakes while learning the business, but catfish had become the mainstay of their farming operation. They had phased out of row crops and focused on catfish, a cow-calf operation, and a small amount of wheat. By now, they were committed to catfish as their primary enterprise.

They built three more ponds on the farm, adding 40 acres to production. This brought their acreage in catfish production to 90 acres (rented and owned) for 1989. "We could have stopped, felt comfortable, and made an adequate living. Now we have bet the farm again, but I have the confidence we can make it work," Curtis said.

Husband and Wife Team

Curtis and ReJeana have been true partners in their farming operation from the beginning. Early on, ReJeana was involved in all aspects—operating the combine and hay baler, as well as helping to make decisions. "I knew almost as much about the operation as Curtis did," she said. In the past few years, ReJeana has not been as involved in the daily management routine, mainly because the couple has two small children and she is a full-time teacher. "I still consider myself as part of a team, however," she said. "I view my role now as more of a sounding board for Curtis. He consults with me on new

ideas and keeps me informed on major decisions. After all," she said with a smile, "I have a great deal of confidence in Curtis' judgment and his ability to manage our operation."

Changing Work Patterns

At the end of one of their first successful years, Curtis and ReJeana compared the hours required to grow row crops with the time required for their fish operation. They were shocked to discover the far greater amount of time it took to turn a profit with row crops. Unfortunately, much of the work on a catfish operation must be done at night, something that most farmers, including Curtis, never planned on. It has been difficult for him to adapt to the rigorous night work.

During late spring, summer, and early fall, the level of oxygen in the ponds can fall dangerously low at night. This is something that requires continual monitoring. Emergency aeration is often used in critical situations. Many nights, Curtis can be found catching a few winks in his pickup truck as he stays close to his investment. Some daytime work, such as feeding, is also required to keep the fish healthy and growing. "It's real easy to see that fish farming can cause burnout," Curtis said. He hopes to avoid this by eventually adding some labor to help with specific areas as more catfish acres are added.

Diversifying into Carp

"'Waste not, want not' was impressed upon me when I was growing up," Curtis said. "When I saw all the grass carp used for weed control in catfish ponds being destroyed during harvest for lack of a market, I knew someone, somewhere, wanted to eat these fish. So, I began making contact with Asian restaurants."

These contacts developed into a market. Today Curtis is known locally as the "Carp Man," and farmers in the area don't throw away grass carp anymore. In fact, they stock grass carp regularly, along with the related bighead carp, to sell to Curtis, who in turn ships the fish by air from Birmingham to various cities in the United States. Curtis said the carp market has allowed him to learn that there are many markets for fish in the United States and that the fish marketing infrastructure is highly developed.

The Gvillos credit their success to diversification—both in production and marketing. At first, all they knew to do was to take their catfish to the local processor. Today, however, their mar-



On Lake Texoma in Oklahoma, Gene Dodds (l) of the Red Ark Development Authority and ARS fisheries biologist Wendell Lorio seek ways for aquaculture farmers to grow a profitable crop of catfish. (USDA Photo by Bob Bjork, 0887X828-12)

keting experience with carp has given them confidence as they expand their operation; they know that there are alternative outlets for their fish if they can't make a profit selling to a processor.



Evaluating various strains of catfish for such factors as growth rate, disease resistance, and feed conversion are part of the work of reproductive physiologist Cheryl Goudie and geneticist Gary Carmichael. The research is part of a joint effort with scientists at Memphis State University and the U.S. Fish and Wildlife Service's Southeastern Fish Cultural Laboratory at Marion, Alabama. (USDA Photo by Barry Fitzgerald, 88BW2286-7)

New Technologies

Even though aquaculture is in its infancy, advances in pond design, aeration techniques, and harvesting equipment have given a big boost to the industry's growth and profitability. Genetic engineering, improved feeds and therapeutics, better water quality and conservation, and new product development all offer the potential for more efficient production. Some serious problems—such as disease and bird control—still loom. But the Gvillos are banking on these problems being solved through product research and development.

Future Strategies

The next big challenge at "Old South Fish Farm" will be to produce more fish per surface acre of water by stocking fingerlings after each harvest of large

fish. This will be done 2 or 3 times a year in a procedure called "topping off." Yields and efficiency should increase, making the operation more productive and profitable while offering a marketing edge. Over time, the Gvillos hope to become more efficient as the rented ponds are eliminated in favor of ponds built close together on their own farm.

The Gvillos haven't forgotten how diversification helped them become successful. This year they are stocking hybrid striped bass in one pond as an experiment to see if they can grow them profitably on a larger scale, mixing them with their other products.

Curtis foresees the day when he will have 200 acres of water on his own land. This would provide an opportunity for the children to come into the business if they choose. Curtis and Re-Jeana also envision a new house overlooking their ponds in the not-too-distant future.

The outlook for continued aquaculture development in the Southeast is excellent. The combination of warm climate, relatively abundant water, good soils, stagnant wild fish supplies, and increasing consumer demand all indicate the potential for solid growth.

The Pendletons of Kansas: Doing Better with Asparagus and Tomatoes

John and Karen Pendleton are enthusiastic and articulate college graduates. They have been farming with John's parents on about 1,000 acres near Lawrence, Kansas, for nearly a decade.

Al Pendleton, John's father, bought the land 30 years ago. During most of the period since then, the operation has been typical of farms in northeast Kansas—corn, wheat, soybeans, and a cattle feeding operation.

But 8 years ago the younger Pendletons added a new, separate enterprise—growing asparagus, tomatoes, and a few other spring crops, which they market through a pick-your-own operation, a farm market, sales to area restaurants, and other channels.

They began with a half acre of asparagus, selling their first crop to buyers on a list. Today they have an intensive spring season, during which they sell the products of 20 acres of asparagus, two or three crops of tomatoes grown in a greenhouse, and a few other crops. For the time being they have left the cattle business, which had been the "lifeline" of the farm.

Creative Planning

The shift to alternative crops has led the Pendletons to devote substantial time to planning. They worked with Bob Hajicek, a consultant with the Kansas State Board of Agriculture, to develop business and marketing plans. "Bob asked us what direction we wanted to go in," John said. "Then we sat down and wrote a business plan.

"Most farmers don't sit down and write a business plan, although they should be doing that to help focus their strengths, weaknesses, opportunities, and struggles, and to learn how to take those struggles and turn them into opportunities," he said.

Although the "planning we do is not as technical as most business advisers would recommend," John said, the Pendletons spend substantial time participating in programs on farm production and marketing that help them plan for the future. "Karen and I have gone to lots of horticultural and farm marketing programs and seminars. We find them to be an opportunity to set goals and learn new techniques," he said.

Carole Jordan, Public Information Officer, Kansas State Board of Agriculture, Topeka, KS

Participating in these programs gives them a chance to “brainstorm” about the future. “We think about what we would like to do—what sounds like fun to us—and what we would like to be doing 3-5 years down the road. If our operation still involved strictly row crops and the feedlot, we simply wouldn’t have the opportunity to do that kind of planning,” he said.

“Eight years ago we thought of something we would like to do in a few years, and we probably are farther along now than we ever dreamed we would be back then,” John said. “It has taken a combination of luck and conscious effort to change our business.”

Leaving Cattle

Some changes were forced on the family. John’s father had knee surgery and could not participate in farm work for a long period. “When Dad had the operation, we decided to go a winter without feeding cattle—rather than hiring outside labor to take his place,” John said.

The decision to leave the cattle business, at least temporarily, was based on other considerations as well. “We started looking at updating equipment. If we decided to stay in cattle, we’d have to update, spend a tremendous amount of money,” John said. “We decided that running our greenhouse and the spring vegetable business was more enjoyable than hauling manure.

“So we auctioned off some of the cattle equipment and committed ourselves to staying out of the cattle business for at least a few years. We still have our silos for feed storage and the concrete feedlot, so if we decided to go back into cattle, we would have the basics.

“The economics of cattle raising was a problem. We were borrowing to buy

calves and fatten them. At the end of the year, we always hoped we’d make enough to pay off what we had borrowed,” John said. “For 30 years, cattle were the lifeblood of this farm, but the prices in the first 5 years of the 1980’s changed all that. It’s a relief to be out of cattle. Now we’re not forced to feed cattle just because we have always done it—which is so typical in agriculture, doing the same thing in the same way in the same season every year.”

However, John said that “corn and soybeans are still important to us. They still pay the bills.”

“Why Not Asparagus?”

“We were looking at some different things then anyway. I had just gotten out of school. Dad had given some thought to raising hogs, and we were looking at building a swine facility,” John recalled. “Then I thought about a pick-your-own strawberry operation. Some neighbors across the river were looking at strawberries too, and we went to a seminar together. We didn’t want to compete with each other, so we thought, ‘Why not asparagus?’

“Eight years ago, asparagus was almost a joke here. We had one small row in the garden. One day my dad said he liked asparagus so much that we should plant the whole garden with it. That spring we got caught up with our other work and had some spare days. So we went out and bought 1,000 asparagus crowns.”

They talked to the Douglas County Extension Agent, who encouraged them to “go a little farther.” So they started to expand. The business grew from garden size to about 200 plants in a field down the road. The next year they added a half acre of asparagus.

The new asparagus variety they selected—after making use of research by

nearby Kansas State University and others—had several advantages over older varieties. The hybrid variety produces three times the yield of traditional varieties—and it has greater vigor and disease resistance.

The vegetable business is considered a separate enterprise from the farm corporation, and it pays rent to the farm. Because the vegetable crops are not covered by Federal commodity programs—as are more traditional crops such as corn and wheat—the costs and book-keeping are totally different from those of the traditional farming business.

Learning from Experience

“In our first year, we picked all the asparagus ourselves on that half acre,” John said. “Word of mouth spread so fast that all we did was take orders from friends and callers. We had to limit individual sales to 10 pounds. We’d harvest in the morning, call a person on the list, and they’d pick it up.”

That year was relatively easy. There was no need to advertise—they had all the customers they could handle—and they didn’t need major storage space. But they had a lot to learn about their new crop.

Asparagus production varies from day to day during the harvest season. In warm, moist weather (the ideal is 90-degree days and 70-degree evenings), production is prolific, and there is a need to harvest twice a day. However, if it turns cool, the plants grow more slowly and the harvest may come to a brief halt. The Pendletons had to learn how to market their crop in view of these changes in availability.

“That year was a seat-of-the-pants operation. There was no one with experience in the area to talk to,” John said. “The research we read helped us under-

stand production expectations, but that still doesn’t tell you about the day-to-day changes during asparagus season. We had to learn that ourselves.”

Growing asparagus also required more physical labor than did growing row crops—which are planted and harvested using heavy machinery—as well as more public interaction. “You bend over and plant asparagus. You pull weeds and pick by hand. It means sweat and hard work. And you need to enjoy meeting the public, because you sell the product yourself,” John said.

Adding Tomatoes

It was not long before the Pendletons decided to add other crops to their new enterprise. “When we first started, people would come out, get \$10 worth of asparagus, stand there with a \$20 bill and literally say ‘What else do you have that I can buy?’ ” John said.

“We decided we needed more products to make that other \$10 sale. We were fortunate that a nearby farmer had approached us about selling his greenhouse. After some study, we decided that tomatoes might be profitable. Our expense for the used greenhouse was minimal. So we decided to get into tomatoes.

“Kansas State University had a fit. They told us more people lose money than make money on tomatoes. But with minimal investment and a market right on the farm, it has been working for us,” he said.

In addition to the pick-your-own and farm market sales, tomatoes are sold to wholesale buyers during the fall and winter. They are labeled with the “FROM THE LAND OF KANSAS” food trademark developed by the Kansas State Board of Agriculture to focus attention on the State’s farm products.

Access to Labor

As the vegetable enterprise grew larger, the Pendletons could no longer do all the work themselves. They had to face the issue of hiring outside labor. They considered hiring either migrant laborers or area students.

Their decision to hire students was based on their need to have a flexible work force that could adapt easily to the varied schedule of asparagus production. "We need to be flexible. We can't control the weather," John said. "Although we know good migrant workers would be very efficient, we have been pleased with using high school and college labor. We're fortunate to have a good pool of those employees to choose from in Lawrence. Having urban areas nearby gives us an edge—both in finding a market and getting the labor we need."

"Stacking" Crops

The enterprise has grown by "stacking" new crops onto the primary asparagus operation. "We stacked the tomatoes on top of the asparagus business, stacked some rhubarb and some sweet corn," John said. "Our newest top of that stack is planting 700 peony plants for the Memorial Day market. We think there is potential for good business right at the end of asparagus season."

The Pendletons now grow 20 acres of asparagus and may expand in the future. But they have decided to hold tight for a few years to make sure they can sell everything they now produce.

Marketing

The Pendletons credit the marketing staff of the Kansas State Board of Agriculture with helping them succeed in selling their alternative crops. At the suggestion of the marketing staff, the

Pendletons obtained a registered trademark for their products. They participate in State-sponsored promotional events, and their farm is listed in the State's mail order catalogue for "FROM THE LAND OF KANSAS" products.

As members of the area fruit and vegetable growers' association, they have the opportunity to share ideas and techniques with farmers who have similar businesses. The association produces a map that shows the location of all fruit and vegetable growers in the area—which helps pick-your-own and farm market customers find the Pendleton's farm.

Even though they have decided not to add to the acreage of the new enterprise for a while, their business is growing in other ways. They have built a larger farm market to accommodate the increasing number of customers.

"We used to sell out of an old grain bin. It was cute and unique, but on busy weekends it was bursting at the seams and extremely hot. Crowds just got too big, and people couldn't get in," John said. "So we're converting part of a machine shed to the market. It still will have room for equipment storage, and it will give Karen office space."

The farm markets its crops to Lawrence area restaurants—"One of them even changes its whole menu during asparagus season to feature our product," John said. They have tentatively dipped into the Kansas City restaurant market 40 miles to the east—which could be a source of new customers if they decide to expand their asparagus operation.

The Pendletons also sell to the food service company that supplies meals to the residence halls at the University of Kansas, and they have a stand at the twice-a-week farmers' market in Lawrence. "Our customers are loyal to local people. We're lucky," John said.

“Most of what we capitalize on is marketing,” John said. “That’s the part of agriculture most people in Kansas aren’t familiar with. They plant, raise, and harvest their crops with little thought to marketing.”

Getting the Word Out. The Pendletons use advertising to attract new business and to manage their customer load. They have access to a small, local radio station with a community calendar. On days when the harvest is at its peak, they let potential customers know about it through the radio broadcast. The live, three-times weekly radio show is also used to tell customers to wait a day if the weather is cool. Besides radio, the farm advertises in the Lawrence daily newspaper.

Insurance

The Pendletons carry liability insurance to cover customers who come onto their farm, and they have workers’ compensation for their 15 part-time employees. They have developed an employee handbook, which they believe helps the student workers take their jobs more seriously.

The farm has recently purchased product liability insurance because they believe restaurants and stores that carry their products will soon require this type of insurance. Crop insurance isn’t available for asparagus; but luckily, asparagus recovers quickly from most storm damage.

A Family Business

Although the asparagus season officially lasts from April 15 through the end of May, the Pendletons are busy all the time planting and “stacking” crops, creating production and marketing plans, doing research, attending farm management programs, and working on other aspects of the farm operation.

They have developed a customer survey which they hope will provide information that can help them plan for future expansion.

During the asparagus season, when John and Karen are working 12 or more hours a day on the vegetable operation, Al Pendleton is hard at work planting corn. Someday they may have to decide whether to drop that part of the farm business—or hire outside help.

Although they employ some outside labor now, the Pendletons still do most of the farm work. “We work together,” John said. “If something happened to Karen, I don’t think I could run the business alone. And the support of my parents in other activities on the farm allows us time to devote to asparagus and tomatoes.”

Profile of a Successful Manager: From Beef, Eggs, and Grain to a Dairy

The decision to convert to a dairy operation was not an easy one for James and Ann Shipley. Approximately 1 year of planning—with help from Extension personnel, lenders, and farmers—was completed before the final decision was made. The Shipleys had owned and operated a beef cattle, egg, and grain farm in the Powell Valley area of East Tennessee for 3 years. However, they were not satisfied with the net income and return on investment from this operation.

Experience played a key role in converting to a dairy operation. Jim had operated a dairy in partnership with his brother for 10 years and had worked as a dairy inspector for the State. Also, Ann is a practicing veterinarian.

Construction of the dairy facilities began in the spring of 1987, and the first cow was milked in August of that year. The cow herd presently consists of 107 head, and the cropping system includes 51 acres of double-cropped corn and wheat silage, 25 acres of alfalfa, 10 acres

of mixed hay, and 200 acres of pasture. Additional alfalfa and alfalfa haylage are contracted from local producers.

The Shipleys' management strategies are simple yet effective. These strategies include maintaining a debt load of less than \$2,000 per cow, planning the purchase of inputs, and allocating as much time as possible for evaluating and making management decisions.

"Never finance beyond the expected life of the asset," James said. Borrowed capital has been utilized to finance long-term assets, while the sale of beef cows and savings were used to finance short-term assets for the dairy.

When purchasing inputs, the Shipleys "shop and compare" in a 200-mile radius of the farm. Their purchasing decisions are characterized by the statement, "Be aware of what is available, and never buy anything at one man's price."

The Shipleys have a young son, William Andrew. Future goals for the farm include expanding to 150 cows,

Kevin W. Ferguson, Area Farm Management Specialist, University of Tennessee Agricultural Extension Service, Dandridge, TN



Farmers Ann and James Shipley, Extension Leader Mike Haskell, and area farm management specialist Kevin Ferguson discuss the favorable economic consequences realized from switching to a dairy farm. (Photo by Nancy M. Cann, University of Tennessee)

reducing feed costs, and increasing milk production. James and Ann realize that expanding the cow herd will require additional crop acreage. Foundation plans have already been made to accomplish this goal while maintaining a debt load of less than \$2,000 per cow.

The Shipleys have a keen understanding of the competitiveness of American

agriculture. They also realize that to be successful, they must maintain an efficient operation in the years ahead. If their first year of operation is any indication, the Shipleys should be a mainstay of American agriculture in the future.

Part III



Tools:

Techniques Farmer Managers Use

To Run Farm Businesses

Farm Records Can Improve Profitability

Farm managers need a complete and accurate farm records system in order to make informed management decisions that will help maintain or improve farm business profitability. Records systems have four functions: (1) as a service tool (to assist in reporting to the Internal Revenue Service and other taxing entities, creditors, other farm asset owners, and to others who have a vested interest in the financial position of the business), (2) as an indicator of progress, (3) as a diagnostic tool for identifying strengths and weaknesses, and (4) as a planning tool.

Records can also help the manager plan and implement farm business arrangements and do estate and other transfer planning. Furthermore, farm managers can use records to determine what the efficiencies and inefficiencies are, measure progress of the business, and plan for the future.

Farm business managers do not need to be accomplished accountants or experts on taxes and law. However, they do need to know how to keep the required records for their businesses; they must realize that all business decisions have income tax consequences; and they

must be able to evaluate the accounting and legal professionals who serve their businesses.

Choosing a Records System

There are many farm records systems. They range from simple, hand accounting systems using pencil and paper to sophisticated double-entry computer accounting systems. Some require a mix of hand and computer operations.

Choose a system that is user friendly and designed specifically for farm managers. It should not only meet the accounting and planning needs of the farm operation, but it should also satisfy income tax, legal, and other outside reporting requirements. Select a program with good detailed instructions for use. Buy your system from a reputable, reliable, and accessible person, organization, or company. Particularly in the case of computerized systems, the supplier should provide training for first-time and experienced users.

Selecting a Specific System

The first step is to determine your objectives for the system—both personal and business. For farm managers

Robert A. Luening, Professor Emeritus of Agricultural Economics, University of Wisconsin, Madison, WI

who do not want or need a system for business and financial management, a relatively simple system that satisfies income tax reporting requirements may be adequate. For those who are heavily in debt or who want to improve profitability, a more complete and detailed system is probably required.

There are some highly simplified farm accounting books and systems, and there are some systems that are complicated and difficult to use effectively. Consider beginning with a basic system and working up to a more complex and useful system. Choose a system that enables you to expand the amount of information you use, that provides ease of entry, and allows you to retrieve crucial data in a useful form. At a minimum, the system must satisfy all income tax reporting requirements, including maintaining documentation of transactions for as long as such information is required by income tax regulations and other laws.

Use generally accepted accounting principles adapted to the farm business. For some farm operations, a simple, single-entry, cash-basis accounting system will be adequate. For others, a more complicated accrual system (which allows for inventory changes) with double entry (a debit and credit for each entry) will be required. For many farms, the recordkeeping system should be able to accommodate different types of business arrangements. It is vital that the organization or company from which you purchase the system be available to keep you and the system up-to-date on changes in tax laws and accounting procedures.

Look for a system that efficiently transfers information from a check or invoice to the income tax records, to business and financial reports, to a complete business analysis, to a forward

plan, and which provides a pro forma financial statement.

All of this should be accomplished with the least possible data manipulation. With an effective system, a major portion of the needed data gathering, assembling, and validating is completed by the time the income tax work is properly done. From there, it is only a short step to having a data set that can help you improve business decisionmaking and increase profitability.

The system that you select should show the past and present financial status of the business and serve as a tool for the ongoing processes of planning, controlling, and decisionmaking. Do not keep records for the sake of recordkeeping. Gather information that is useful and that can help you in making decisions. Do everything with the goal of meeting your business and personal objectives.

When trying out a records system, it is helpful to enter a list of typical transactions from your farm over the span of a year into the system. Think of this as a field test to determine if you, your business, and the record system are compatible. Each user will have to weigh his or her needs and wants against different system capabilities. Selecting the most appropriate records system for your business is like any other investment decision. You have to ask yourself whether the cost of additional capacity and complexity is worth the added returns.

Accounting Methods

Here are explanations of the two types of accounting methods that are used in farming.

Cash-Basis Accounting. This method is used primarily for income tax reporting purposes in service industries. Generally speaking, in cash-basis ac-

counting, income is recorded as income when it is received and expenses are recorded as expenses when they are paid. (However, there are some exceptions to this rule in the income tax regulations.) Cash-basis accounting is simple and can provide some income tax advantages for businesses that are heavily dependent on inventory changes.

However, this method also has drawbacks. Cash-basis accounting can grossly distort the financial position, profitability measures, and operational results of the farm business. It is necessary to convert cash-basis accounting to accrual accounting for analysis and decisionmaking purposes. This can readily be done by making some adjustments at the end of the accounting period so that both economic and financial feasibility can be measured.

Accrual Accounting. This method is required for tax purposes for most trading and manufacturing businesses. However, it is not required for most farms. In accrual accounting, expenses are considered expenses when they are accrued (or committed) and income is counted as income when it is earned. This includes changes in inventories. This method does not depend on how the cash moves in the business. Expenses incurred are matched with related income to determine net income. This approach provides a better continuous picture of profitability. However, an assessment of cash-flow is still needed to determine the financial feasibility of the business.

Basic Recordkeeping for Your Farm Business

Recordkeeping need not be a complex managerial activity if some simple rules are followed. Of course, a well designed farm record system can make the job easier as well as more efficient.

Tips for Better Recordkeeping.

Here are six suggestions for better recordkeeping in your farm business:

1. Never, never net it out. Always record the gross or total amount.
2. Always go through all the steps for each transaction.
3. Run everything through a checking account.
4. Separate business income and expenses from personal income and expenses. Have separate checking accounts.
5. Do periodic accuracy checks.
6. Staple your calculator tape to each page as you total your book so that you can refer back to it. Do not do your work twice—once is enough!

Note that items one and two fit together as do items three and four.

Tax Records

The Internal Revenue Service requires that you have a set of farm records to show all taxable income and expenses that are deductible. This can be done in many different formats. But however it's done, the farm manager or recordkeeper must maintain accounts to show the three different types of farm income: sale of "resale" (purchased) items, other ordinary income, and sale of capital items. Records must also be kept of the two types of expenses—ordinary expenses and capital expenses—along with some expenses that could be classified in either category. Included in the expense category is the annual depreciation record.

Your record system should support items on your tax return. It must provide evidence of the types of income and expenses, that the bill was paid, and that the bill was for business expenses. For this, you need sales slips, invoices, receipts, deposit records, and

canceled checks. Your income and expenses should be clearly identified. It is important to separate business expenses from personal expenses. The best way to do this is to maintain separate checking accounts for the family and the farm business. Be careful to identify loans, debt repayment, and interest expenses. These records must be kept as long as they have any income tax or legal ramifications.

Other required records might include capital item records, Social Security records, Occupational Safety and Health Administration (OSHA) records, Federal Unemployment Tax records, worker's compensation, retirement plans, health insurance, operating agreements, carryovers and carrybacks, net operating losses, and income tax credits. (The Farmers' Tax Guide, IRS Publication No. 225, can provide current information on all of these requirements.)

The Complete Farm Records System (ALERE)

There are five basic accounts in any complete financial records system. They can be easily remembered by the learning the nonsense word ALERE. The five accounts are assets, liabilities, equity (net worth), receipts (income), and expenses (costs).

Assets, liabilities, and equity are the three parts of the balance sheet (or net worth statement). Revenue and expenses are the two components of the earnings statement (also called the profit or loss statement, operating statement, or income statement). The cash part of revenue and expenses are recorded in the cash-flow statement (sources and uses of funds). These "big three" financial statements are the heart of any basic accounting system.

Balance Sheet

This statement summarizes three of the five accounts in a complete accounting system. The general accounting equation for the balance sheet is: Assets equal debt plus equity. Phrased another way, assets minus debt equals equity.

The balance sheet is divided vertically into two parts—the left part called assets (what the business owns) and the right part called liabilities (what the business owes). The total of the two parts must be equal; that is, they must balance. There are two kinds of liabilities: (1) debt or outside capital and (2) equity (net worth) or inside capital. The debt represents claims lenders have on the assets while equity represents claim owners have on the assets. See the sample balance sheet (or net worth statement).

Horizontally, the balance sheet can be broken into three categories.

Current Assets. The first category, current assets, contains those assets that are in cash or are usually turned into cash during the course of the year. For tax purposes, they are assets that would be considered ordinary income if sold or ordinary expenses if purchased.

Intermediate Assets. The second category includes intermediate assets; they are not true current assets but neither are they true long-term assets. They are assets used in the production of income and are generally viewed as non-real estate property (such as machinery and productive livestock).

Long-Term Assets. The third asset category is composed of long-term assets. These generally include real estate property used for producing income.

An asset's length of life is sometimes used to distinguish between the three asset types; for example, assets that last

Net Worth Statement (Also Called Balance Sheet)

Assets	Year	Beginning 19		End 19	
Current Assets		Value # 1	Value #2	Value #1	Value #2
1	Cash on Hand				
2	Accounts Receivable				
3	Livestock Held for Sale				
4	Feed and Grain				
5	Supplies and Prepaid Expenses				
6	Other Current Farm Assets				
7	Farm Current Assets (1+2+3+4+5+6)				
8	Nonfarm Current Assets				
9	Total Current Assets (7+8)				
Intermediate Assets					
10	Machinery and Equipment				
11	Breeding and Dairy Livestock				
12	Other Intermediate Farm Assets				
13	Farm Intermediate Assets (10+11+12)				
14	Nonfarm Intermediate Assets				
15	Total Intermediate Assets (13+14)				
16	Total Current Intermediate Assets (9+15)				
Long Term Assets					
17	Farmland and Improvements				
18	Farm Buildings and Improvements				
19	Other Long Term Farm Assets				
20	Farm Long Term Assets (17+18+19)				
21	Nonfarm Long Term Assets				
22	Total Long Term Assets (20+21)				
23	Total Farm Assets (7+13+20)				
24	Total Assets (9+15+22)				

OTHER NOTATIONS: i.e. Contingent liabilities such as latent income tax liabilities, lawsuits and consigning of notes; unusual situation such as debt forgiveness, asset valuation changes, etc.; and other pertinent factors bearing on the Net Worth Statement.

Net Worth Statement (Also Called Balance Sheet)

Year	Beginning 19	Ending 19
Liabilities		
Current Liabilities		
25 Principal Payments Due in 12 Months		
a a. To Primary Lender		
b b. To Others		
c c. On Real Estate Mortgages		
26 Farm Accounts Payable in 12 Months		
27 Other Current Farm Liabilities including Accrued Interest		
28 Farm Current Liabilities (25a+25b+25c+26+27)		
29 Nonfarm Current Liabilities		
30 Total Current Liabilities (28+29)		
Intermediate Liabilities		
31 Deferred Principal Owed		
a a. To Primary Lender		
b b. To Others		
c c. Deferred Accounts Payable		
32 Farm Intermediate Liabilities (31a +31b+31c)		
33 Nonfarm Intermediate Liabilities		
34 Total Intermediate Liabilities (32+33)		
35 Total Current + Intermediate Liabilities (30+34)		
Long Term Liabilities		
36 Deferred Principal Owed		
a a. On Farm Real Estate		
b b. Other Long Term Liabilities		
37 Farm Long Term Liabilities (36a+36b)		
38 Nonfarm Long Term Liabilities		
39 Total Long Term Liabilities (37+38)		
40 Total Farm Liabilities (28+32+37)		
41 Total Liabilities (30+34+39)		

Net Worth		Beginning 19			Ending 19		
Item	Type	Farm	Non Farm	Total	Farm	Non Farm	Total
42 Ending Assets-Farm Line 23, Total Line 24							
43 Ending Liabilities-Farm Line 40, Total Line 41							
44 End Net Worth (this year) (42-43)							
45 Begin Net Worth- Last Year's Line 44							
46 Change in Net Worth (44-45)							

Assets = Liabilities plus owner's net worth or assets = Outside or Debt Money plus inside or Owner's Money

less than 1 year are current, those that last from 1 to 10 years are intermediate, and those that last more than 10 years are long-term. Some accountants use only two categories—current and long term.

A space for notations should be provided at the end of the balance sheet. It is here that contingent liabilities and assets can be noted along with other salient information (such as the asset valuation methods used) that helps explain the data in the balance sheet.

Asset Value. Determining the appropriate asset values is the biggest challenge when developing a balance sheet. The values selected depend on their use. It is best to have a double asset column balance sheet. Then two sets of values can be shown for analysis purposes. One value should be the market value, which is what a willing buyer would pay a willing seller (given adequate time and sufficient knowledge). Credit worthiness and loan soundness are measured using this column. Another value sometimes included is the adjusted tax basis, but this data is readily available from properly kept tax records.

Some would argue that quick-sale value minus contingent liabilities (what you would receive in a rapid, untimely sale minus the income tax liabilities) should be included. Others would use the adjusted tax cost, the actual income tax cost of all assets. Other values that might be used include market value minus contingent liabilities or earnings value (the income approach to appraisal that capitalizes a future earning stream into a present amount).

The balance sheet shows where the money is invested and how the business is financed. It provides a snapshot of the financial position of the business at a particular point in time. It shows the financial and credit soundness of

the business, and it provides comparative data that can be used for evaluating the business and for developing the farm earnings statement.

Farm Earnings Statement

The second of the “big three” statements focuses on current activity. It shows the income earned by the business before taxes and contains the other two of the five accounts in a complete accounting system. The general accounting equation is: Sales minus cost of goods sold minus operating expenses plus or minus inventory and capital adjustments equals income before taxes; or, simply, revenue minus expenses equals income before taxes.

The earnings statement is divided into three sections—the cash operating statement, adjustments for inventory, and adjustments for capital items. The first section shows all cash income and cash expenses, and produces a figure called net cash farm income. The second section shows the inventory adjustment, which results in a figure called adjusted net farm operating income. The inventory adjustment is the difference between the ending current assets and beginning current assets, adjusted for changes in accounts payable. The third section shows the capital account adjustment, which results in net farm earnings—or the return to unpaid labor, unpaid management, and equity capital. The capital adjustment is the difference between the intermediate and long-term assets at the end of the year and the intermediate and long-term assets at the beginning of the year.

The earnings statement ties together the information from the balance sheet with cash-basis income tax accounting data. The bottom line is an excellent measure of the profitability of the farm business.

Cash-Flow Statement

The most action-oriented of the “big three,” the cash-flow statement shows how cash moves into and out of the business. The general accounting equation is: Inflows equal outflows. A complete cash-flow can also serve as a cash accuracy check.

There are many different formats for developing a cash-flow statement. One way is to divide the cash-flow into four sections: (1) income, which is the marketing plan; (2) operating expenses, which is the production plan; (3) capital purchases, which is the investment plan; and (4) principal, interest, and additional borrowing, which is the debt service plan. This type of organization will give you a better perspective of your total cash-flow and will aid in planning and control.

There should be three columns for each accounting period. Then there can be one set of these columns for each month or at least for each quarter. The first column would be called projected, the second column would be called actual, and the third column would be called variance. In this fashion, the cash-flow statement can be used as a financial management control tool. In cash-flow planning for income, operating expenses, and investment, you are asking, “How much am I going to sell or buy? At what unit price am I going to buy or sell? and At what time am I going to buy or sell?” Debt service information can be obtained from credit records and the balance sheet. A 2- to 3-year cash-flow history is useful. Then you can find out how this year is going to differ from previous years. This helps make budgeting easier and more accurate.

The cash-flow statement is useful as an evaluation, control, and planning tool. But used by itself, it can relay false information because it only considers cash. For best results, the cash-flow statement should be used with the balance sheet and earnings statement. Used together, the “big three” provide a complete set of financial statements.

Other Key Accounts

There are several other accounts that either feed into or supplement the five accounts in the “big three” financial statements. These include income accounts, expense accounts, capital item accounts, depreciation records, enterprise accounts for crops and livestock, labor records, marketing records, feed records, experimental records, individual machine records, and family records.

Accuracy Checks

Single-entry cash-basis accounting can result in significant errors. It is best to balance the checkbook against the recordbook on a monthly basis. Then at the end of the year, you can make three accuracy checks: (1) cash-flow, (2) profit/net worth, and (3) liabilities. When these three accuracy checks balance, you can proceed to file income tax and use the records to analyze and manage the business.

Check with your land-grant university's Cooperative Extension Service for additional help and information on farm records systems. For more information, see *Managing Your Financial Future*, instructional edition by R. A. Luening, P. E. Harris, University of Wisconsin-Madison; and R. O. Hawkins, K. H.

Cash-Flow Statement

Item	Month	January		February	
		Projected	Actual	Projected	Actual
1 Begin Checkbook Balance					
2 Sale of Capital Items					
3 Sale of Held for Sale Items (which were purchased for resale)					
4 Sale of Raised Livestock and Poultry					
5 Sale of Crops (specify)					
6 Sale of Milk					
7 Other Sales (specify)					
8 Other Sales (specify)					
9 Other Sales (specify)					
10 Other Farm Sales					
11 Nonfarm Income					
12 TOTAL CASH GENERATED (sum Line 1 thru 11)					
13 Labor Expenses					
14 Crop Chemicals					
15 Fertilizer and Lime					
16 Seeds and Plants Purchased					
17 Other Crop Expenses					
18 Machine Hire					
19 Repair Machinery, Building and Fence					
20 Feed Purchased					
21 Breeding Fee, Vet and Medicine					
22 Other Livestock Expense					
23 Freight and Trucking					
24 Farm Gas, Fuel, Oil					
25 Insurance-Farm Share					
26 Rent-Farm Share					
27 Storage and Warehousing					
28 Taxes (R.E. and P.P.)-Farm Share					
29 Utilities-Farm Share					
30 Travel Expenses-Farm Share					
31 Miscellaneous					
32 Resale Items Purchased This Year					
33 (specify)					
34 Family Living					

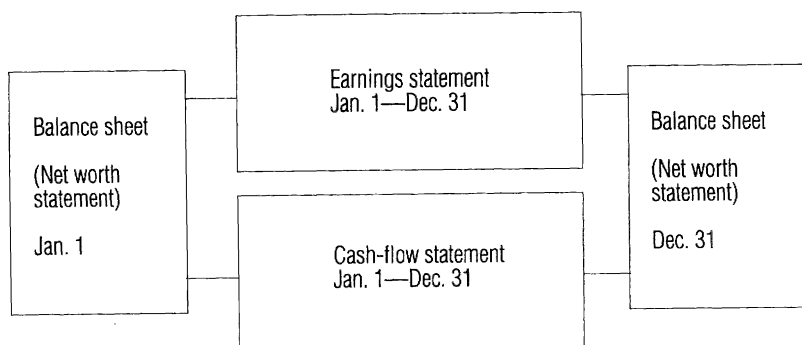
Cash-Flow Statement

Item	Month	January		February	
		Projected	Actual	Projected	Actual
35 Income Tax and Social Security					
36 Nonfarm Capital Purchases					
37 End Checkbook Balance (Desired for Projected) (Actual for Actual)					
38 Total Operating and Living Exp. (sum Line 13 thru 37)					
39 Sub Total: Surplus or Deficit (Line 12 minus Line 38)					
40 Breeding and Dairy Livestock Purchased					
41 Machinery and Equipment Purchased					
42 Buildings and Improvements Purchased					
43 Land and Improvements Purchased					
44 Other Farm Capital Purchases					
45 TOTAL CAPITAL PURCHASES (sum of Lines 40 thru 44)					
46 Cash Surplus or Deficit (Line 39 \pm Line 45)					
47 New Loans-other lender					
48 New Loans-other lender					
49 New Loans-other lender					
50 Total New Loans-Other Lenders (sum Lines 47 thru 49)					
51 Payments-other lender Prin.					
52 Int.					
53 Payments-other lender Prin.					
54 Int.					
55 Payments-other lender Prin.					
56 Int.					
57 Total Debt Payment to other lenders (sum of Lines 51 thru 56)					
58 Cash Surplus or Deficit (Line 46 \pm Line 50 \pm Line 57)					
59 Accumulated Interest That could be (projected) or that was (actual) paid to specified primary lender					
60 Principal that could be (projected) or that was (actual) paid to the Primary Specified Lender					
61 Beginning Loan Balance (Primary Specified Lender)					
62 Ending Loan Balance (Primary Specified Lender)					

Thomas, D. Norquist, D. E. Welsch, R. H. Craven, E. I. Fuller, University of Minnesota-St. Paul; published by Richland Observer, Richland Center, WI, 1987. This series includes *Farm and Family Records* (Book 1), *Farm Business and Financial Analysis* (Book 2), and *Depreciation and Other Tax Records* (Book 3).

Another useful book in the field is *Farm and Ranch Financial Records*, by J. D. Libbin and L. B. Catlett, published by Macmillan Publishing Company, New York, 1987.

How the Balance Sheet, Earnings Statement, and Cash-Flow Statement Fit Together



Evaluating Computerized Farm Accounting Systems

Many farm and ranch managers have discovered that the amount and quality of information they use to make decisions contribute directly to the success of their businesses. The common thread that runs through various aspects of farm business management and decisionmaking is information about both financial and physical characteristics of the farm. The agricultural business environment requires equally sophisticated methods of analyzing that information.

A few short years ago, farmers, ranchers, and small business managers generally had only two bookkeeping choices: (1) keeping their own record-book or ledgers, annually summarizing the information for reporting to the lender and IRS, and (2) using bookkeeping services provided by accountants or farm organizations, such as farm business management associations, which provided the farmer/client with financial reports monthly, quarterly, or

annually. (See Part VII, Chapter 5 for more information on farm management associations.) However, inexpensive personal microcomputers have provided farms, ranches, and small business firms with computerized bookkeeping that was previously available only to large corporations.

When farmers first became aware of the potential of microcomputers for farm accounting and farm decision aids, software for such applications was extremely limited. However, as numerous agricultural and general accounting and bookkeeping software packages became available, farm managers had the formidable task of selecting the best package for their specific needs.

Selecting Accounting Software

The farm manager choosing accounting software has several selection strategies. The simplest alternative is to buy

Ashley C. Lovell, CPA and Extension Economist-Management, Texas Agricultural Extension Service, Texas A&M University, Stephenville, TX, and

Lawrence A. Lippke, Extension Economist-Management, Texas Agricultural Extension Service, Texas A&M University, College Station, TX, and

Jeffrey W. Johnson, Program Coordinator, Stiles Farm Foundation, Thrall, TX

the accounting software package that the computer salesperson or vendor recommends. While this decision is easy, the vendor may not carry an accounting package designed for agricultural applications, or the vendor may lack the accounting knowledge needed to provide support.

Another alternative is to adopt the accounting package that other farm managers in the area are using. Though their experience in setting up and using the package may be helpful, this alternative has its drawbacks. Even though the package may be inexpensive, it may be more costly in the long run than a more expensive yet more suitable package which meets the individual's needs.

A third alternative is to select an accounting system based on "expert" evaluations printed in various publications. The "experts," however, impose their personal values and needs on their recommendations. Moreover, how an accounting software package operates in a descriptive publication typically differs from how it operates on the computer.

A fourth strategy is to adopt some combination of the first three strategies. However, to minimize the risk of selecting the wrong package, a comprehensive approach is best. This fifth strategy differs from the fourth in that, in addition to using bits and pieces of the above approaches, it involves "hands-on demonstration" or "testing" of the accounting system.

Requirements and Resources

Inexpensive microcomputers really have not changed the financial information required, but they have made it easier to generate that information.

Thus, the first step in considering an accounting package is to fully identify objectives, information requirements,



A few years ago, farmers and ranchers had limited bookkeeping choices. (USDA Photo by Bill Kuykendall, 032-7-8)

and expected improvements from computerized accounting activity. Major users of the information include lenders, IRS, and the farm manager. Consider the resources available to computerize the accounting functions. If the firm already has a computer system available and has no intentions of purchasing an additional one, then the capabilities of that system may limit the range of accounting software for consideration. If the business has an IBM-compatible system, many of the accounting packages available should operate on the available hardware. Firms that do not have a computer system must consider the costs of the hardware as well as the software.

Basic general ledger (GL) accounting systems—which provide an income statement, balance sheet, trial balance, and other standard general ledger financial reports—are quite inexpensive. However, many firms want additional software features to complement the basic GL accounting system. Additional features may include check-writer, enterprise, payroll, accounts payable, accounts receivable, inventory, and asset or depreciation management programs. The additional modules are usually available for additional costs and, in many cases, result in substantial expenditures for software.

The knowledge and experience of the individual doing the computerized accounting must also be considered. For example, a double-entry accounting system requires that the user understand basic double-entry accounting to use it properly.

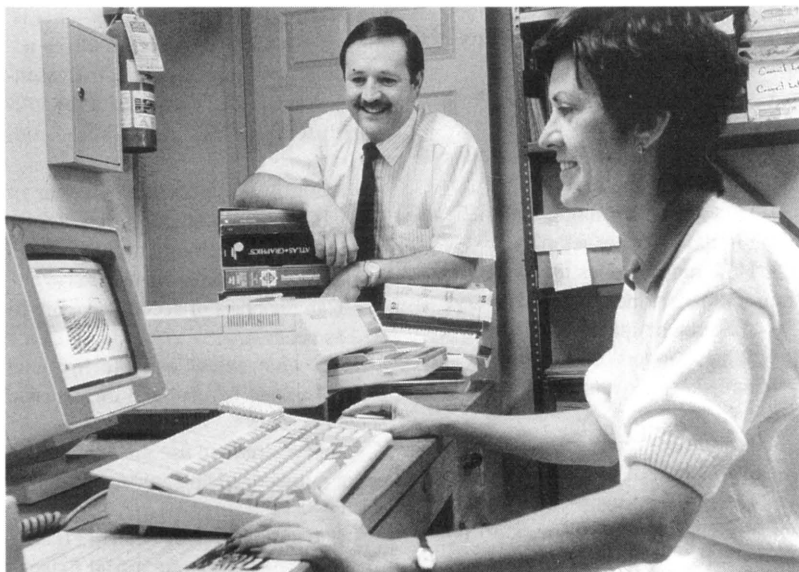
Many farm and ranch businesses also want their computerized accounting systems to generate crop and livestock enterprise information. Such systems will require improved recordkeeping and will, in fact, increase the amount of information that must be recorded. For example, one may have to start recording fuel used by each enterprise, quantity of labor used for each crop and livestock enterprise, and number of tillage practices for each field or pasture.

Identifying and Selecting Software

An important step in selecting software is to identify the accounting pack-

ages available. Publications, vendors, Extension Agents and Specialists, and acquaintances can help to identify available software. Such a search may identify 15 to 30 accounting systems. Most people would want to quickly sort through them, select three to five systems that seem best suited to their individual needs, and examine these systems more closely.

Some packages may be eliminated because they do not meet the farm's hardware and/or computer operating system requirements. The knowledge and experience of the individual who will be doing the bookkeeping may dictate the purchase of a single-entry cash record system. In other instances, the philosophy of the farm manager and/or the education and experience of the computer operator may result in only double-entry accounting systems being viable options. Furthermore, whether the firm intends to maintain cash or accrual-



Today, numerous general accounting software packages are available to aid the farm manager. Extension staffers Kay Hargis and Dan Cotton test equipment at the Boone County, MO, Extension Center Model County Office, where new microcomputer technologies are demonstrated. (USDA Photo, 89BW1214)

based accounts can serve to screen accounting software.

Using a Checklist

Use a checklist to evaluate the three to five accounting packages that the farm will consider seriously. Answer the following questions from the general checklist as well as the four specific checklists for components of your farm's accounting system. Use these checklists for each package under consideration. By comparing the responses to these questions, evaluate the relative merits of each package.

Comparative Checklist for Accounting Software

General Features Checklist. In addition to general information for each accounting package—including program name; vendor's name, address, and telephone number; and computer and operating system requirements (including the minimum internal memory required)—ask:

- Is the package single-entry or double-entry?
- Does the package handle both cash and accrual accounting?
- Does the package support full enterprise records and reports?
- How time consuming and difficult is the initial software setup?
- How quickly does the system post transactions or find a previous entry?
- Are annual updates available?
- What support does the software vendor offer (phone, training, video cassettes)?
- Is a full-feature demonstration diskette available?
- Does the software interface with spreadsheet, data base, and word processing software?
- What level of accounting and computer expertise is necessary for enter-

ing data and reviewing the accounting printouts?

- What are the hardware requirements to run the system?
- What are the data storage requirements (floppy diskette, hard disk, tape)?
- What is the full cost of the system, including all necessary modules and charges required for updates, telephone support, maintenance, and other such services?

When the general features of this section are judged against the farm manager's needs and available resources—including the ability or inability to handle double-entry accounting—the list of accounting packages considered may be shortened drastically.

General Ledger Checklist. The purpose of the general ledger (GL) is to provide the basic financial statements (profit and loss or income statement, balance sheet, and sources and uses of funds statement) as required. Typically, in integrated accounting software, the GL is the cornerstone module—that is, most if not all of the other modules accumulate, summarize, and post essential data to the GL. To evaluate the software package's GL capabilities, consider:

- What is the maximum number of GL accounts the system can handle?
- Are the account numbers and names determined by the user?
- Can the chart of accounts be modified as necessary?
- To what extent can the financial report formats be changed through the accounts setup?
- Is it possible to use nonexistent account numbers when entering GL transactions?
- Is it a double-entry system? If so:
 1. Does it generate a trial balance to verify the books are in balance?

2. Is it possible to enter and post unbalanced transactions?

- How simple is it to make correcting entries?

- Does it generate profit and loss statements and balance sheets using either actual value, market value, or depreciated value bases?

- Does it integrate with enterprise, accounts payable, accounts receivable, and payroll modules?

- Does it generate a sources and uses of funds statement?

Enterprising Checklist. Some accounting systems (single-entry as well as double-entry) are able to track the expenses and sales associated with producing a commodity by using enterprise accounting. This accounting system allows the user to generate enterprise reports to determine the cost of production and profitability for that particular commodity. To evaluate the software package's enterprise accounting capabilities, consider:

- Does it record expenses, income, and physical quantities for each enterprise, providing costs and returns reports for units specified by the user?

- Does it allow enterprises to remain active even if the books for the fiscal year have been closed?

- What is the maximum number of enterprises allowed?

- Does it provide for noncash sales between enterprises without affecting GL account balances?

- Can it generate consolidated costs and returns summaries for all enterprises and for each farm location?

- Can enterprise entries be made through the general ledger, accounts payable, accounts receivable, and payroll modules?

- Can "budget versus actual reports" be generated from budgets previously established for each enterprise?

- Can the system automatically allocate overhead to each enterprise using allocation rules specified by the user?

If the manager intends to select software that supports full enterprise accounting, a number of potential packages will likely be eliminated. It is not wise to give further consideration to general ledger software that provides "some" capability for enterprise, cost, or departmentalization accounting. In most instances, "some" capability will not be satisfactory for farm managers who want to do enterprise accounting.

Accounts Payable and Payroll Checklists. Other accounting needs and objectives may require the use of accounts payable, payroll, accounts receivable, depreciation or asset management, inventory, and check-writer. In addition to the general ledger and enterprise modules, many farms can benefit from accounts payable, payroll, and depreciation modules. Typically, the public accountant maintains the depreciation schedule. To evaluate the software package's accounts payable capabilities, consider:

- Will it run both cash- and accrual-based accounting?

- Does it list invoices by date due and indicate the amount of cash necessary to pay invoices?

- Does it post invoices to the GL as a batch or one at a time?

- Does it print checks and IRS 1099 reports?

- Does it provide for entering transactions resulting from daily cash-flow handwritten checks?

- Does it provide reports on vendor histories?

To evaluate the software package's payroll capabilities, consider:

- Can it calculate payroll using either hourly wages or piece rate—which ever is greater?

- Does it automatically calculate all appropriate Federal, State, and local payroll taxes?

- If an accrual, double-entry system, are accrued taxes payable automatically posted to the GL?

- Will it handle employee advances and housing deposits?

- Does it print payroll checks and IRS W-2 forms?

- Does it automatically update the GL and enterprise modules?

- Does it provide employment history reports by specified date ranges?

The Right System

Selecting accounting software and computerizing recordkeeping or accounting systems must involve the key players—the farm manager, the onfarm accountant and/or data-entry operator, and the farm's public accountant. The public accountant can advise the farm manager on financial and tax accounting needs and can help evaluate the adequacy of accounting principles in the software. In some instances, the public accounting firm may be another source of computer support. In a few instances, farms have purchased software which is compatible with that used by the farm's public accountant, thus providing the public accountant easy access to the client's computer data files.

Remember, the purpose of accounting is to provide the decisionmaker with timely, meaningful, and (preferably) easy-to-read reports. Thus, some users will insist upon selecting software that allows the report format to be user-defined. From a management and control perspective, the option to print actual results compared side-by-side to budgeted values is desirable. Maintaining an audit trail after computerizing is desirable for the operator as well as management and outsiders. In addition to

the option to print to disk or on paper, the option to review the reports on the computer screen saves time and paper. Since time costs money, the ability to print all desired reports in one batch is preferable to sequentially printing each report if desired by the computer operator.

Being overly price conscious may cost more in the long run. An inexpensive system that does not meet your needs is a greater waste of money than a more expensive system that does more than you need. You may not use all of a system's capabilities immediately, but in the future, you might—and you will already have the capability.

For further information on evaluating computerized farm accounting systems, contact the Cooperative Extension Service of your land-grant university or one of the authors.

How To Use a Farm Accounting System To Help Analyze Your Finances

Planning and financial control are two of the most difficult and troublesome tasks faced by modern farmers and ranchers, but they are also the cornerstones of the management process.

Management usually is defined in three steps: planning, implementation, and control. This chapter focuses on how an accounting system can help you develop the information necessary for planning and controlling your farm business activities.

Purposes of Accounting Systems

Before decisions can be made or analyzed, the information necessary for the decisions must be available. The primary goal of any farm or ranch accounting system should be to provide business management analysis and control. The accounting system should be geared toward the farm or ranch manager; if the accounting system is not used, it is for all practical purposes worthless. Many uses of the accounting system relate to individuals other than the manager, so the system must be able to pro-

vide financial information for them too. The accounting system supports major management functions by providing the information necessary for making decisions. The accounting system should supply three types of information:

- Scorekeeping, or evaluating performance (generally a retrospective look available in the financial statements);
- Attention directing, to flag ongoing operating problems, inefficiencies, and opportunities (identified through analysis of the financial statements); and
- Problem solving, or analyzing the relative merits of alternative courses of action.

The accounting system provides information the farm manager needs for external reporting for tax and credit purposes; financial control of routine operations; business management analysis; and reporting to multiple owners—for example, in corporations and partnerships.

Tax Requirements. The Internal Revenue Service (IRS) and most State income tax authorities require that enough business records be kept to jus-

Thomas L. Frey, Professor of Agricultural Finance, University of Illinois, Urbana-Champaign, IL, and
James D. Libbin, Professor of Agricultural Economics and Extension Farm Management Specialist, New Mexico State University, Las Cruces, NM

tify all income and expense claims reported on an income tax return. The lack of standardized requirements for a minimum acceptable set of records has led some farmers and ranchers to store their cash register receipts, invoices, bank statements, and canceled checks in a box or file drawer and to do little more. Legally, such records are sufficient. This system can become an extremely expensive one, however, during an IRS examination, if the manager is called upon to substantiate claims made on an old tax return.

Other Taxes and Investments. If complete and accurate records are maintained, problems with estate, gift, and property taxes can be minimized. Furthermore, the ability to participate in investments outside of normal farm or ranch business activities can be enhanced by having the information readily available to determine whether a particular investment opportunity is financially feasible.

Credit Application. In recent years, lenders have come to stress repayment capacity of loans, as well as collateral security. Most borrowers now need to show that the investment for which the loan is intended will be able to generate enough income to pay back the interest and principal owed within the specified time period.

Financial Control of Routine Operations. Just as lenders are concerned with cash flows and repayment capacity, astute business managers have also become greatly concerned with cash-flow management. How much to borrow, either in long-term credit or in operating credit, is only half the story. When and how much to pay back is just as important as tight control of cash reserves. Paying operating money back after a sale may not be the wisest option if it puts the business in a cash-

flow bind later. Interest charges must be analyzed in addition to liquidity needs of the business and of the family. Preparing a realistic cash-flow budget is one of the vital steps in the annual recordkeeping process. A cash-flow budget is a projection of anticipated cash receipts and cash expenditures, by category, for a future time period—typically 12 months. Borrowing and repayment plans are included. Cash budgeting involves all the steps required in the whole farm or ranch planning process: marketing (including price projections for inputs as well as outputs), yield projections, and enterprise combinations.

Despite the difficulty of preparation, the cash-flow budget helps document managerial abilities and loan repayment capacities. Furthermore, the cash-flow budgeting process can be extended one more step to provide an extremely effective financial control device. If monitored monthly, or even quarterly, the cash-flow budget can indicate potential problems before they arise. This ability to foresee problems allows the manager to adjust before the fact rather than react afterward.

Business Management Analysis for Strategic Planning. If a farmer or rancher is disciplined enough to develop and maintain a records system to meet income tax reporting and credit application needs, then virtually all the needed information will be available to meet what is probably the most important goal of a farm or ranch records system: business management analysis. Good farm or ranch business managers know exactly what their variable and total costs of production are. They know whether they are meeting the goals of their marketing plans or their cash-flow budgets. They have analyzed their strengths and weaknesses, both in physi-

cal terms and financial terms. They know where their business has been, where it is now, and where it is going.

Corporations and Partnerships. Multiple-owner forms of business organization require more detailed records because of more intricate tax reporting requirements, State corporation laws, and additional documentation needs of lenders. Perhaps the most important need for more detailed records in partnerships and corporations comes from the likelihood of problems and potential conflicts among the individuals involved.

Lease and Family Distributions. Individuals involved in informal family partnerships, joint ventures, and share leases need to rely on a detailed records system to ensure fairness in distribution of profits and contributions.

Financial Statements

The “scorekeeping” information relates directly to capturing financial transaction data and organizing it into financial statements. Therefore, a major output of the accounting system should be three financial statements—balance sheet, income statement, and statement of cash flows. These combine to provide a complete financial story. (For further information on financial statements, see Part III, Chapter 1.)

Balance Sheet. This statement shows financial position at a moment in time. All assets are listed with a dollar value assigned. Assets include everything owned that has value. Liabilities are identified as any obligations owed to others at that moment—as claims by others against the assets. The difference between assets and liabilities is net worth, sometimes called owner equity.

Income Statement. This statement summarizes revenue and expenses by categories to indicate net income. An

accrual income statement captures both cash and accrual entries, such as change in grain and livestock inventories and change in accounts payable and accrued interest and taxes. It is useful for an income statement to list farm and non-farm income separately, and then deduct income tax and Social Security to generate a net income figure.

Statement of Cash Flows. This new financial statement summarizes relevant information about cash receipts and cash payments. All gross cash receipts and all gross cash expenditures are segregated into cash flows provided by (a) operating activities, (b) investing activities, and (c) financing activities. The sum of these three changes explains the change in cash and cash equivalents during the operating period. In addition, there is a section called “reconciliation of net income to net cash provided by operating activities.” This shows the detailed accrual adjustments that account for the difference between cash income from operations and accrual net income.

Uses and Interpretations of the Statements

Just doing the “scorekeeping”—producing the financial statements—is not enough. It takes interpretation and analysis of the financial information to meet the “attention directing” and “problem solving” needs.

Begin the interpretation by evaluating net worth—a key measure of financial wealth. On a market value basis, net worth shows what would be left if all assets were converted to cash and all liabilities paid. Next, study net income and determine if it is sufficient to meet withdrawals for family consumption. Over time, you cannot take more out of the business than is earned. On a cost basis, the change in net worth from one year-end balance sheet to the next

equals net income minus withdrawals. The next step is to use data from the financial statements for a systematic financial analysis of the operation.

Financial Analysis. The first step in financial analysis is to identify appropriate criteria that will facilitate a comprehensive analysis; then, measures for each criterion must be established. For each of the following five criteria, one or more measures are suggested.

Liquidity. A short-run concept describing a firm's ability to meet short-run obligations when due, without disrupting the normal operation of the business. The ratio of current assets to current liabilities is a common measure.

Solvency. A longer-run concept relating to capital structure and a firm's ability to pay all obligations if assets were liquidated. The focus is on total debt in relation to equity. It is a financial risk measure, because the risk of not being able to repay borrowed capital and interest increases as the proportion of debt to net worth increases. Another equally useful measure is debt as a percentage of total assets.

Profitability. Relates to revenue less expenses, called net farm income. But a dollar measure of net farm income is not sufficient because the size of business is not considered. Furthermore, net farm income is typically a return to unpaid labor, management, and capital, in contrast to other businesses where it is a return only to capital. Return on assets and return on equity are two common measures of profitability. Net farm income is typically adjusted to get a return to capital expressed as a ratio to total assets. For example, if there is a \$6,000 return and \$100,000 assets, a 6 percent return is indicated. A similar approach is used to determine return on equity.

Financial Efficiency. A measure of the efficiency of a business in generat-

ing profit out of gross production. The secret of a business is to maximize the dollar value of profit out of each \$1,000 value of farm production (a measure of gross production). Net farm income divided by value of farm production is one useful measure. Similarly, operating expenses, interest, and depreciation can individually be evaluated as a proportion of the value of farm production.

Repayment Capacity. An assessment of the firm's ability to repay debt. Ability to repay capital debt and interest is a major concern. One measure is all interest plus principal payments on capital debts, expressed as a percentage of the value of farm production. A non-ratio method—capital debt repayment capacity—is calculated as net income plus depreciation less withdrawals.

How Good Is Your Financial Performance?

There are three key ways to interpret the various financial measures and ratios. Comparative analysis is a comparison of one farm's results with those of farms and ranches of comparable size and type. For example, if a farm's debt to asset ratio is 40 percent, how does this compare with the debt level of other successful operators? Trend analysis compares results in one year with results achieved in past years. A trend analysis shows strengths and weaknesses and helps focus attention on areas where further strengthening is needed. Comparison of actual performance with the cash-flow budget requires developing an operational plan for the year ahead and then comparing monthly or quarterly performance with projections. Management should focus on variances, or the differences between budgeted and actual performance.

Comparative Analysis

John T. Farmer, a midwestern grain and beef producer, knew that some changes were needed in his farm operation. But he did not know what changes to make. John realized he needed to determine the strong and weak points of his business, but he did not know how to make these assessments. For agricultural producers, like John, there are a number of farm and financial management techniques to analyze a farm business' profitability and efficiency. Given the tight profit margins in agriculture, these techniques can make a huge difference to agricultural producers.

One such management technique is comparative analysis, which allows the individual producer to compare his or her farm with a specific set of farms, say the "top 25 percent net income group." That is, comparative analysis allows the individual producer to ask, "How does my farm business compare with other farms of similar size, type, and enterprise mix?" By using this management technique, an agricultural pro-

ducer can determine both the strong and weak points of the farming operation and make the needed changes.

Comparative Analysis Requirements

An accurate and detailed set of farm records is needed to use any management technique effectively. The farmer needs income and expense information for the whole farm, as well as for individual enterprises. But more important, the farmer needs production and physical data—yields, acreage, investment, number of head sold, feed cost per hundredweight, and pounds produced.

Since a farm operation is compared with a specific set of farms of a similar type and size, the analysis can be on a countywide, regional, or statewide basis. Comparative analysis usually involves a comparison with a set of farms that represent either the average group, the top 25 percent net income group, or the top 10 percent net income group. Most State Extension Services provide information from actual farm records

Larry N. Langemeier, Professor and Extension Agricultural Economist, Department of Agricultural Economics, Kansas State University, Manhattan, KS, and

Frederick D. DeLano, Extension Agricultural Economist, Farm Management Association, Kansas State University, Ottawa, KS



Beef producers, like other producers of agricultural products, use a number of financial management techniques to analyze their farm businesses in terms of profitability and efficiency. (SCS Photo by Erwin W. Cole, Minn-1771)

that can be used for this analysis; if not, they will have typical cost-return budgets for various enterprises.

For his analysis, John felt that his farm operation should be compared with all farms of the same type that by income comprised the "top 25 percent income group." John's comparative analysis considered whole-farm and management factors, as well as enterprise analysis and management factors.

Whole-Farm Analysis

Comparative analysis on a whole-farm basis allows the farmer to compare his or her farm operation with a group of farms of a similar type and size. Income and expenses must be compared on an item-by-item basis to determine items that are potentially problematic. If possible, income and expenses should be divided between the crop and livestock segments of the farm operation. With separate records, the farmer can analyze such expenses as gasoline, oil, and utilities on a per-head

or per-acre basis. But even without this fine tuning of the records, important information can be gleaned from the whole-farm information.

John's farm operation and the comparative group he chose are compared in table 1. Table 2 outlines specific whole-farm management factors. From the whole-farm analysis, specific expenses can be studied on a crop- or live-stock-segment basis. For example, John's per-crop-acre fertilizer use was \$10.16; for the high income group it was \$15.19. Thus, John may need to obtain soil tests to determine if additional fertilizer would increase overall production. The "gross crop value/acre" was \$178 for the high income group and only \$145 for John's farm operation, although the "crop production costs/acre" were almost identical. Other expense items—such as feed purchases, veterinarian fees, and livestock marketing—can be analyzed on a per-head basis to identify any existing problems.

Important management factors can be

Table 1. Whole-Farm Income and Expenses

Item	Top 25% Income group*	John T. Farmer
Dollars		
Income:		
Beef	172,705	62,022
Grain	49,955	28,981
Hay-forage	2,000	882
Cash crops	45,048	22,852
Government payments	22,131	14,194
Other income	15,919	10,295
GROSS INCOME	307,758	139,226
Expenses:		
Hired labor	12,890	3,555
Repairs	18,832	10,761
Interest paid	19,104	17,674
Feed purchased	58,380	20,426
Seeds, insurance	12,884	7,013
Fertilizer, lime	14,125	7,670
Machine hire	4,371	3,631
Miscellaneous	1,990	1,378
Veterinarian, medicine, drugs	3,568	1,317
Crop storage	3,305	1,829
Livestock marketing	5,473	2,243
Gasoline, oil	8,930	5,507
Taxes	5,116	2,768
Farm insurance	2,033	1,133
Cash rent	14,028	6,610
Herbicides, insecticides	10,921	5,868
Utilities, automobile	5,596	2,874
CASH OPERATING EXPENSES	201,575	102,255
Machinery depreciation	21,670	12,489
Building depreciation	5,002	1,924
TOTAL FARM EXPENSE	228,247	116,668
NET FARM INCOME	79,511	22,558
EQUITY CHARGE-10 PERCENT	46,618	22,213
LABOR-MANAGEMENT RETURN	32,893	345
*Represents actual farm data from producers enrolled in the Kansas Farm Management Association Program.		

Table 2. Whole-Farm Management Factors

Item	Top 25% Income group	John T. Farmer
Factor ratios		
Financial:		
Expense/\$100 gross income	74.16	83.80
Interest paid/\$100 gross income	6.21	12.69
Percentage return on net worth	4.90	-4.35
Total loans/total assets	0.28	0.43
Crop factors:		
Crop acres	930	755
Gross crop dollars/acre	178	145
Crop production costs/acre	102	97
Machinery investment/acre	35	34
Machinery costs/acre	46	48
Labor usage:		
Work days/employee	255	188
Net income/employee	31,932	14,939

derived from the whole-farm information even if the compared group is comprised of larger farms. For example, the "total expense/\$100 gross income" ratio was 74.16 (\$228,247/\$3,077.58) for the high income farms compared to 83.80 (\$116,668/\$1,392.26) for John's farm. John needs to increase his farm operation's gross farm income—given his set of resources—or lower his expenses—given his gross income. The reduction of his expense/gross farm income ratio to 75.00 would increase his net income by \$12,248—or about 54 percent. Another important management factor is the "interest paid per \$100 of gross farm income" ratio. The high income farms had a ratio of 6.21, while John's ratio was 12.69. John may need to analyze ways to reduce overall debt load—such as selling some land while increasing the use of rented land.

Labor usage provides additional information. A common standard is 250 work days per employee per year. John's "work days/employee" value of 188 indicates the need to either reduce the farm's overall labor force or to increase crop acreage and/or livestock head size.

Enterprise Analysis

Comparative analysis on an enterprise basis allows the farmer to gain information on the strong and weak points of a specific enterprise. Accurate enterprise records are required and must include income and expense data, as well as production information. Most State Extension Services develop typical cost-return budgets for various crop and livestock enterprises for use in comparative analysis when actual farm enterprise data are not available.

Based on preliminary studies, John believed that definite problems existed in his beef finishing enterprise and that the use of comparative analysis might highlight his enterprise's weak areas. John compared his beef finishing enterprise to beef finishing enterprises in the top 25 percent income group. Although John's enterprise was only one-half the size of the top 25 percent income group, the size factor can be removed by converting all income and expenses to a per-hundredweight basis.

John's costs per hundredweight for feed purchases, veterinarian fees, and livestock marketing was much higher than those of the top 25 percent income group (see table 3). The reasons for this result may be numerous, such as the type of cattle purchased, condition of the cattle when placed on feed, high death loss, and type of facilities used.

Through comparative analysis, John can determine the weak points in

his cattle feeding enterprise, but he cannot determine the exact causes of the problems. For these three expense items, John's costs were \$6.62 per hundredweight higher than the high income group. On an average gain per head of 550 pounds, this additional cost represents \$36.41 per head or a total additional cost of approximately \$10,000 for the enterprise.

Marketing may be another weakness in John's cattle feeding enterprise, although the differences in selling price may be due to the type of cattle sold. John may want to consider such marketing techniques as forward contracting or hedging. A more indepth comparative analysis would provide information on prices paid for inputs, as well as the price received for all outputs.

Table 3. Enterprise Analysis—Beef Finishing

Item	Top 25% income group	John T. Farmer
Number of Head	550	275
Dollars per hundredweight		
Market:		
Selling price	71.50	67.25
Purchase price	67.00	66.50
Expenses:		
Feed costs	34.43	39.26
Veterinarian, medicine, drugs	1.26	2.62
Livestock marketing	0.90	1.33
Repairs	1.27	1.10
Gasoline, oil	0.47	0.98
Utilities	0.52	0.47
Other	18.06	17.01

Enterprise Budgeting

Management is a process in which information is the input and decisions are the output. Budgets provide information for farm management decisions. Budgets can be constructed to estimate what you think will happen in the future. These projected budgets are used to make decisions regarding changes in the farm plan by predicting the consequences of envisioned changes.

Budget estimates also can be used as a criterion against which to measure actual performance. At the end of the year, an actual budget—or historic budget—should be constructed and compared to the projected budget. By comparing the two budgets, the farm manager can see which income or expense items were overestimated or underestimated. This comparison provides information for the manager to improve future decisions.

Types of Budgets

There are four basic types of farm budgets: whole-farm, cash-flow, partial, and enterprise. All budgets include income and expenses from the farm operation. The income sources and expense items included in the budget determine the budget type.

Whole-Farm. A whole-farm budget includes all income and expenses for a single year for a given farm plan. Therefore, a whole-farm budget can be prepared only after the whole-farm plan has been developed. This requires taking inventory of the farm resources and bringing farm financial statements up to date.

Whole-farm budgets usually include both cash and noncash income and expenses. Cash income includes cash received for farm products, custom work, and Government payments. Noncash income includes pasture for grazing owned livestock and wheat straw. Cash expenditures are paid for with cash within the time period of the budget. They include principal and interest payments on loans. Noncash expenses are incurred when farm resources are utilized without cash payment. Typical noncash expenses include unpaid operator and family labor; unpaid operator management; and equipment, buildings, and land owned outright by the farm business. (See Part III, Chapter 7 on whole farm budgeting.)

Karen Klonsky, Extension Specialist, Department of Agricultural Economics, University of California, Davis, CA

Cash-Flow. A cash-flow budget includes only cash receipts and cash expenditures. A cash-flow budget is usually constructed on a monthly basis for 1 year to show the timing of the receipts and payments and the monthly cash surpluses or deficits. A cash-flow budget may include the cash receipts and expenditures for the whole farm or for an individual enterprise.

Partial. A partial budget estimates the expected changes in income and expenses when a change in the whole-farm plan is incurred. It typically compares two alternative enterprises or two alternative production practices for the same enterprise. Only the increases and decreases in income and expenses expected from the proposed change are included. This simplifies the analysis of the proposed change. Both cash and noncash expenses are included in a partial budget. (See Part III, Chapter 6 on partial budgeting.)

Enterprise. An enterprise budget, the focus of this chapter, contains all of the income and expenses associated with a single enterprise—including direct and indirect expenses. Direct expenses are those that are directly associated with a specific enterprise. An example is seed for alfalfa. Indirect expenses are those costs that are associated with more than one enterprise. An example is the cost of insurance on farm equipment. Direct expenses are relatively easy to estimate. Indirect expenses, however, must be allocated to all associated enterprises. There are several allocation methods that are typically used. Each has its strengths and weaknesses. (Allocation methods are discussed in the next section of this chapter.)

The term “enterprise budget” is used to refer to both projections and summaries of costs and returns. Projections of annual costs and returns for an enterprise are called enterprise budgets, but

they are also known as gross margin calculations, projected budgets, or pro forma budgets. Summaries of costs and returns for an historic period may also be called enterprise budgets, but they are often referred to as cost of production studies, income and expense budgets, enterprise statements, or enterprise accounts.

Historic records are essential to developing projected budgets.

Developing an Enterprise Budget

The first step in developing an enterprise budget is to identify the enterprises on the farm. An enterprise is generally defined as a crop or type of livestock produced for profit. However, many growers identify each field or orchard block as a separate enterprise.

A farm might have two alfalfa enterprises and three walnut enterprises rather than one enterprise for each crop. By subdividing the same commodity into several enterprises, the farmer can monitor crop performance on a field-by-field basis and pinpoint problems as they occur. However, increasing the number of enterprise budgets also increases bookkeeping detail.

Many farmers who develop separate budgets for each field find that the differences are not significant enough to warrant the required paperwork. However, other farmers who develop one budget for each commodity find that the information generated is not detailed enough to make certain production decisions. Experiment with the two methods to see which generates the information you need.

In general, enterprise budgets are constructed from whole-farm records by allocating the income and expense items for the whole farm to individual enterprises. From an accounting perspective, this can be done at the end of the year

or during the year as the transactions take place. The latter has the advantage of increased accuracy.

The cash journal—which includes the cash receipts and expenditures for the year—is the most critical farm record for developing enterprise budgets.

The best approach to budgeting combines enterprise and whole-farm budgets. Record direct expenses and income to enterprises as the transactions occur and charge indirect expenses to whole-farm accounts. Then, at the end of the year, allocate the indirect expenses charged to the whole-farm account to the enterprises. This requires setting up income and expense accounts for each enterprise or using supplemental worksheets to develop the enterprise budgets.

Income. Assigning income received from the sale of farm products to the appropriate enterprise is usually straightforward. However, when cash is received this year for last year's enterprise and cash receipts for this year's enterprise are delayed until next year or later, assigning income can be problematic. Often, the exact amount of income to be received from a sale is not known with certainty at the time the product is sold.

Care should be taken to credit the correct enterprise and to include income for one production year so that it can be compared to the expenses for the same enterprise for the same production year. In some cases, this means estimating part of the expected income. The budget can always be revised when more information becomes available.

Expenses. The major categories of expenses included in an enterprise budget are labor, materials, machinery, overhead, and investment. The income statement for the farm as a whole includes totals for each of these categories. The total from each of these cate-

gories is allocated to the farm enterprises. In practice, the allocation process may be different for each expense category.

Labor. Labor records are a means for computing wages, as well as allocating labor costs to enterprises and to cultural operations within enterprises. Time cards should be filled out daily and should detail the time spent in each enterprise. The equipment used should be recorded at the same time.

The information on time cards should reveal the total number of labor hours to be directly allocated to each enterprise. The appropriate hourly rate must include wages plus worker's compensation and Social Security insurance. In addition, the value of any noncash benefits—such as housing or a pickup truck—should be assigned a value for the year, divided by the total number of hours, and included in the hourly labor rate.

Labor expenses such as road maintenance, sick leave with pay, and paid vacations cannot be directly charged to an enterprise. These should be added up, divided by the total number of labor hours, and added to the labor rate at the end of the year.

Materials. Quite often a bill will be for materials applied to several enterprises. At the time the bill is received, the allocation to each enterprise can be written right on the bill. The expenses can then be recorded in the appropriate enterprise expense accounts. This method works well for fertilizer and pesticides.

On an irrigated farm, water is charged to each enterprise according to use. The cost of obtaining and delivering the water should be included in the total expenses. Irrigation labor is charged to each enterprise as labor and should not be included in the cost of water. Quite often the amount of water applied to

each enterprise is not known with certainty and must be estimated.

Machinery. Machinery operating costs include fuel, lubrication, and repairs; ownership costs include depreciation, interest, taxes, insurance, and housing. It is not possible to allocate each of these expenses separately as they occur. Instead, the total cost of the machinery is calculated and then charged to the individual enterprises at cost. On paper, the farm is renting the machinery to (and from) itself and breaking even on the venture.

A list of hourly rates should be developed for each truck and tractor and other self-propelled machinery. The hourly rates are developed so that the total of the hourly charges will equal the total of all costs for farm machinery. It is not necessary to develop a list of rates for each implement. The expenses associated with implements can be spread over the tractor rates and, thus, simplify bookkeeping.

Overhead. Overhead includes management, property taxes, fire insurance, road maintenance, accountants' fees, legal fees, telephone, clerical costs, and other office costs. These costs are difficult to allocate to enterprises and are often incorrectly omitted from enterprise budgets. Misallocation and omission mask the true profit picture. These expenses should be recorded for the farm as a whole and then allocated at the end of the year.

Allocating indirect expenses is probably the most difficult aspect of developing enterprise budgets—it is certainly the most highly contested. However, consistency among budgets is ultimately what is most important. Consistency allows budgets to be compared and budget calculations to be explained. Share of gross income, share of direct costs, and share of total acreage are the

most commonly used methods to allocate indirect expenses.

- **Share of gross income.** Indirect costs can be allocated to each enterprise according to the share each contributes to whole-farm gross income. For example, if crop A generates 40 percent of the gross income, then it will be assigned 40 percent of the indirect costs. Suppose the casualty and liability insurance bill for the whole farm is \$1,000. Then the total insurance expense allocated to crop A is:

$$.40 \times \$1,000 = \$400.$$

The allocated amount is divided by the number of acres in that crop to get the per-acre expense. Suppose there are 50 acres of crop A. The insurance expense per acre is:

$$\frac{.40 \times \$1,000}{50} = \$8$$

This method may cause problems if at least one of the enterprises has volatile prices or yields. The percentage share of indirect expenses will vary widely from year to year and make long-run profit comparisons difficult.

- **Share of direct costs.** Indirect costs may be allocated to each enterprise based on the contribution to whole-farm direct costs. The direct costs for each enterprise are added together to get the whole-farm direct costs. The percentage share of indirect costs for each enterprise is calculated by dividing the direct costs for each enterprise by the whole-farm direct costs.

This allocation method is appropriate when the highest cost enterprises require the most management and office time. This method has the advantage of being less variable over time

than the share of gross income method. In practice, it tends to attribute a higher cost share to labor-intensive crops. This may be more appropriate for some expenses such as a supervisor's salary than for others such as building repairs.

- Share of total acreage. Perhaps the simplest allocation method is to divide the indirect expenses by the total producing acres to calculate the cost per acre.

This method can be applied even when the whole-farm plan is not known with certainty. It is also useful when you do not want the cost of an enterprise to depend on the choice of other enterprises. It is most appropriate when indirect expenses do not vary greatly with labor or capital intensity of the enterprises or if the farm enterprises have relatively similar resource requirements.

Investment. Investment expenses—sometimes referred to as ownership costs or fixed costs—are incurred on land, buildings, the irrigation system, breeding stock, orchard trees, and machinery. In some budget formats, the investment expenses for machinery are broken out from the operating costs and grouped with the other investment costs. Investment expenses include depreciation and interest on depreciable assets and interest on land. Depreciation is the portion of the original cost of an asset that is counted as an expense each year. It is a way of spreading out the cost of an asset over the life of the asset.

While the simplest method of calculating depreciation is to use the depreciation schedule prepared for the Internal Revenue Service, this method can be misleading. In practice, depreciation is taken as quickly as possible to minimize taxes paid. This may give an unrealistic profit picture because expenses are heavily weighted toward the beginning of the asset's life and are too low

in later years. For example, orchard trees can be depreciated over 11 years.

This means that from the 12th year on, the trees will show no remaining value, and the profit from the orchard enterprise may be unrealistically high.

For management purposes, a straight-line depreciation schedule for the true life of the asset might give the best results. Straight line depreciation (DEP) is calculated by subtracting the salvage value (SV) from the purchase price (PP) and dividing by the useful life measured in years (LIFE). The equation is:

$$DEP = \frac{PP - SV}{LIFE}$$

As a rule of thumb, interest on an asset is calculated by multiplying the average value of the asset over its lifetime by the appropriate interest rate (I). The average value (VALUE) is determined by adding the purchase price to the salvage value and dividing by 2. The equation used is:

$$Interest = \frac{(PP + SV)}{2} \times I$$

Land does not depreciate; therefore, the purchase price equals the salvage value. The above equation simplifies to:

$$Interest = PP \times I$$

A combination of debt and equity capital is usually used to finance a farm business. The interest on debt capital is simply the interest paid on any loans. The interest on equity capital is the opportunity cost of tying up funds in the farm business that could be earning income in another investment. The interest rate to use is the weighted average of the available loan rate and investment rate for equity.

From Enterprise Budgets to Whole-Farm Budgets

One method for developing a whole-farm budget is to construct budgets for each enterprise. For each budget include only the income and direct expenses associated with the enterprise. In a separate budget, list the indirect expenses and other farm income including income from custom work, leases, or rentals. This budget type will be referred to as the “other farm income and expenses budget.” Add together the budgets for each enterprise and the “other farm income and expenses budget” to form a whole-farm budget.

This approach is useful for planning resource requirements or measuring whole-farm performance. It is not adequate for comparing the profitability of alternative enterprises or for measuring performance of individual enterprises.

Comparing Budgets from Various Sources

Thus far, the discussion has focused on constructing enterprise budgets from farm records for use within the firm. However, enterprise budgets are developed by other people and organizations such as banks, State Extension Services, real estate appraisers, private consultants, and USDA’s Economic Research Service, which publishes annual cost-of-production studies for major crops and livestock. These budgets can be extremely useful as a basis of comparison for farm performance and as a source of information about the resources required for new enterprises. Care must be taken to understand how the budgets were constructed and their appropriateness in a context other than the one in which they were developed. These budgets may be statistical averages from a select group of growers or representative costs from a hypothetical farm situation.

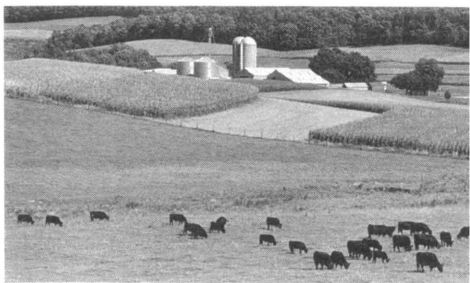
It is most important to consider the yield and price assumptions underlying the income estimate. The same crop grown in a different region will undoubtedly mean a different yield and marketing channel. Note whether or not Government payments are included as income.

With respect to expenses, take note of the cost items that are included. In comparing two budgets, look at the overhead items listed. Quite often an enterprise budget will not include office expenses or legal fees. Check whether interest on an operating loan is included. If it is, note the interest rate and the appropriateness for the current situation. Also check labor rates and whether or not taxes and benefits are included in the rates.

Some budgets include harvest and post-harvest handling costs while others do not. For example, alfalfa harvest costs may or may not include moving and stacking bales in a shed.

Find out what depreciation method is used for investment costs and what interest rate is applied. Many enterprise budgets fail to include buildings in the expenses.

Enterprise budgeting will take time; however, once you make it a yearly habit, it will pay off.



Farm management decisions are aided by four basic types of farm budgets: whole-farm, enterprise, cash-flow, and partial. (Photo by Tim McCabe, 0981x1234-21)

Partial Budgeting: Looking at the Small Picture

Managers of today's farms are constantly being assailed by situations requiring them to make decisions. Some decisions are big ones, others not so big, but each has an impact on the success or failure of the farming enterprise. Little decisions may not seem crucial at first, but they may have a way of being repeated time after time. A small mistake repeated many times can add up to a large loss. Or, on the positive side, a small savings repeated often enough may make the difference between red and black on the income statement.

Some of the decisions or changes managers might be considering could have far-reaching impacts—on other parts of the business or for a long period of time. Others are relatively small or simple, in the sense that their impacts are confined to a small or single part of the business or will only be felt for a limited time. It makes sense to use an analysis tool that is commensurate with the size or complexity of the decision. Partial budgeting is a relatively simple tool that can help managers better operate the farm business.

When To Use Partial Budgeting

Partial budgeting is used to analyze the costs and returns of business decisions or changes that affect only a small part of the operation. It is a method to formalize those "back of the envelope" calculations and reduce the chances of making a mistake or overlooking an important part of the decision. Examples of situations where a partial budget might be used include:

- Substituting one crop for another when only small parts of your acreage or resources are being used,
- Adding a few head to a livestock enterprise when there is surplus labor available,
- Adopting a new production practice,
- Participating in a Government program, or
- Taking advantage of an early payment discount on a fertilizer bill.

These examples give an idea of the scope of decisions for which partial budgeting might be appropriate. If the partial budget starts to look too complicated, analyze whether you should be

Bart Eleveld, Extension Economist, Oregon State University, Corvallis, OR

using a total farm budgeting approach instead. (See Part III, Chapter 7 on whole-farm budgeting.)

Why Change?

First ask yourself, “What am I trying to accomplish with this decision?” What are your objectives? Usually, we assume the objective is to increase profit or net income from the farming operation. Keep in mind, however, that other factors may be important in the decision. Reserving a certain amount of free time for family or community activities might be an example. Also, some costs and returns may not be cash transactions. Depreciation and operator labor, for example, are not out-of-pocket expenses. In certain instances, your “bottom line” may be how the decision affects cash flow rather than profit. In this chapter, profit or net income will be the decision criterion.

Components

Any business decision, when it is fully implemented and all necessary adjustments have been made, can affect profitability in only four possible ways. It can add to profit by either 1) increasing returns or 2) reducing costs. The change can subtract from profit by 3) adding to costs or 4) reducing returns. Although this sounds simple, the difficulty lies in separating these four possible effects, not omitting anything, and

not counting anything twice. We will set up a simple account for each decision (see table 1).

To train yourself to think about all the possibilities, force every small decision into this framework, even if some of the categories turn out to be unused.

Joe and Curley

Joe Rancher for the past several years has been hiring his neighbor, Curley Farmer, to custom swath his 50 acres of alfalfa hay twice a year. Curley charges Joe \$20 per acre each time he swaths the hay, but is willing to rent the machine to Joe for \$25 per hour as recorded on the hour meter. Joe would buy the fuel (8 gallons per hour at \$.85 per gallon), and Curley would maintain and repair the machine. Joe figures he could do 4 acres per hour, but he would have to take time off from an extra job he has with the farm supply cooperative where he makes \$8 per hour. Because of improved timeliness of harvest, Joe feels he will be able to sell higher quality hay if he cuts it himself. He expects to be able to sell his 5-ton-per-acre yield (including both cuttings) for \$2.50 per ton more than he did before.

Setting this problem up in a partial budgeting framework will help Joe decide whether he should continue with the custom hire arrangement or rent the machine and do the work himself. Be-

Table 1. Summary of Partial Budget Components

Additions to income		Subtractions from income
Added returns		Added costs
Reduced costs		Reduced returns
Total additions	minus	Total subtraction
= Net change in profit		

gin with the four categories in table 1 and start to fill in the details. Refer to table 2 as you work.

What Joe Gains

Added returns. The higher return for the better quality hay that Joe feels he will be able to harvest amounts to \$625 (50 acres x 5 tons per acre x \$2.50 per ton). Notice that we only include the change in returns.

Reduced costs. If he rents the swather, Joe will eliminate the custom fee of \$2,000 (50 acres x 2 cuttings x \$20 per acre).

What He Loses

Added costs. When he rents the swather, Joe will have to pay the rental fee, as well as purchase fuel. For both of these expenses, calculate how many hours it will take to complete the operation. Since 50 acres need to be cut twice during the year and Joe estimates he can do 4 acres per hour, the operation should take 25 hours altogether (50 acres x 2 cuttings ÷ 4 acres per hour).

The rental fee will be \$625 (25 hours x \$25 per hour). The fuel cost will be \$170 (25 hours x 8 gallons per hour x \$.85 per gallon).

Reduced returns. If Joe decides to do the swathing himself, he will have to give up wages from his part-time job. This is a classic example of an opportunity cost—an economic return you have to give up because you are using resources in a particular way. The opportunity cost, in Joe's case, is the value of wages he could have made if he chose not to rent the swather. In this example the wages amount to \$200 (25 hours x \$8 per hour). Assume this is a before-tax amount.

Analysis and Precautions

When totaling the additions to income (the left side of the partial budget in table 2), the result is \$2,625. The sum of the subtractions from income (the right side of the partial budget) is \$995. Calculating the difference between these totals shows that Joe has an increase in profits of \$1,630. This is

Table 2. Partial Budget: Renting Hay Swather vs. Custom Hiring

Additions to income		Subtractions from income	
Added returns:		Added costs:	
Better quality hay		Rental fee	
50 acres x 5 ton/acre x \$2.50/ton	\$ 625	25 hours x \$25/hours	\$ 625
		Fuel costs	
		25 hours x 8 gal/hour x \$.85/hour	\$ 170
Reduced costs:		Reduced returns:	
Custom fee		Lost wages	
50 acres x 2 cuts x \$20/acre=	\$ 2,000	25 hours x \$8/hour	\$ 200
Total additions	\$ 2,625	Total subtractions	\$ 995
Results:			
Change in before-tax profit:		\$ 2,625 - 995 = \$ 1,630	
Change in after-tax profit:		\$ 1,630 x (1 - .15) = \$ 1,386	

a before-tax increase, however. Assuming that Joe is in the 15 percent marginal tax bracket, he will retain only 85 percent of the increase in income after paying income tax. Thus, the bottom line, after taxes, is an increase of \$1,386. While it would appear that this budgeting exercise has proven the swather rental to be a profitable decision, note a few cautions. First, we have looked at only one alternative to the present action of custom hiring. A partial budget, by its very nature, can only compare two options. There might well be other actions worth investigating. Purchase or long-term lease of the swather, for example, might prove advantageous. Obviously, we would need to calculate several more partial budgets to investigate other alternatives.

A second precaution, mentioned earlier, is that it might be worthwhile to look at cash-flow impacts in addition to profitability impacts. In this particular example, the results would be the same; but if some of the economic costs

and returns were of a noncash nature, the results could be different.

Third, if you decide on a long-term investment, be aware that initial expenses are more costly than expenses that occur in the future. This is because money saved or received today, instead of being spent, can be put to an alternative, profitable use. Account for the time value of money when income and expense streams are not constant through time.

A final caution is that a partial budget analysis is only as good as the data and estimates that went into the calculations. The garbage-in/garbage-out rule always applies. Use care and be realistic when you predict returns and expenses for new alternatives.

Once you become accustomed to it, you will find yourself using partial budgeting more and more frequently to analyze little decisions that crop up in the day-to-day management of your farm.

The Whole Farm Plan: Looking at the Big Picture

The whole farm plan, or total farm budget, is an outline of the proposed operation of a farm business. It indicates what to produce, how much to produce, and how to produce it.

There are two types of whole farm plans—a long-range plan and a short-range or annual plan. The long-range plan sets a course for the business, projecting the crop and livestock programs that will provide the greatest net returns over a period of years. Because the plan is a projection of an average year in the future, average prices and yields are used when developing a long-range plan.

The annual plan is for a particular year—showing the transition from the present farming system to the system proposed in the long-range plan. The annual plan uses expected prices for the coming year, and it may deviate from the long-range plan to take advantage of yearly price fluctuations.

Why Have a Plan?

The experiences of more than 50 farmers from Tennessee who participated in a 6-year whole farm planning demonstration project suggest that total

farm budgeting can help increase farm profits. Farmers who developed and then followed their proposed crop and livestock plans had an average projected net farm income of \$42,991 per farm, and their actual average net farm income in the sixth year of the demonstration project was \$44,746. Farmers who developed plans but did not implement them had a projected average net farm income of \$36,690 per farm; however, their actual net income in the sixth year of the demonstration program was minus \$6,017. In fact, they had a negative net farm income all 6 years, while the group that followed their plans had a positive net income all 6 years.

Although planning can help make efficient use of farm resources, preparing the plan is only the first step. The plan must be implemented.

Creating a Long-Range Plan

The first step in preparing a long-range farm plan is to set goals. The planning approach described here assumes that the primary business objective is to maximize, or at least increase, net farm income.

Estel H. Hudson, Professor of Agricultural Economics, University of Tennessee, Agricultural Extension Service, Jackson, TN

The next step is to take an inventory of resources—land, labor, capital, and management.

Land Use. Farmers who participate in soil and water conservation planning with a local Soil Conservation District (SCD) already have an inventory of their land resources. Farmers who do not have inventories should begin by constructing a map of their farm or obtaining a map from the county Agricultural Stabilization and Conservation Service (ASCS), Soil Conservation Service (SCS), or SCD office.

Identify each field and record the acreage. Identify soil types, erosion problems, wetlands, rock outcrops, and any other obstructions that would affect the cropping system. Make separate groupings of the fields that can be planted in continuous row crops, those that should be in a row crop-sod rotation, and those that should be in hay or pasture. The tillage system is important

in planning land use; land that is not suitable for continuous row crops under conventional tillage may be usable with no-till.

Record the crops that can be grown in each field and the expected average yield, based on the average yield for each field over the past 3 to 5 years. If the fertilizer program or cultural practices are to be changed, this should be reflected in the yield estimates.

Labor. Classify labor by quantity and quality. In most cases it is the labor distribution rather than the total labor supply that is of most importance in the farm plan. Therefore, record available labor for each 2-month period. A full-time operator can be expected to supply about 250 hours of labor per month. Hired labor—seasonal and regular—should be evaluated in the plan based on quality, wage rate, and availability.



In taking an inventory of the land, either construct a map or obtain one from the county ASCS or SCS office. South Dakota SCS District Conservationist Shirley Gamen discusses a range conservation plan with landowner Harry Livermont. (SCS Photo by Eugene H. Alexander, Jr., SD-889)

Capital Inventory. This category includes buildings, machinery, livestock, and money—cash and available credit. Record each building's dimensions, conditions, present and alternative uses, and value. List each piece of machinery and record its condition and value. Record the quantity and value of each class of livestock. Determine the amount of money and credit available to invest. If credit is used, prepare a net worth statement to help determine the amount of money that can be borrowed safely.

Managerial Skills. The most difficult factor to evaluate is management ability. Start by studying your farm records, noting the yields, rate of production, and experience with various enterprises. Two other factors are also important in assessing your managerial potential. The first is to identify the types of enterprise that interest you. The second is to assess your willingness to seek and follow sound advice; without that ability, you will have a difficult time as a farm manager.

Enterprise Budgets

Selecting the right enterprises is a key factor in successful farming. Major crop and livestock enterprises vary considerably in their return per hour of labor, percentage return on capital, and return per acre of land. While some enterprises offer a high potential return, others often result in a negative return when all costs are considered.

Enterprise budgets are used to compare the potential profitability of different crop and livestock systems. (See Part III, Chapter 5 for information on how to prepare and use enterprise budgets.) Sample enterprise budgets for the major crops and livestock in a given region are usually available at County Extension Offices. Use the sample budgets as a guide and make adjustments to fit specific situations. Recent

farm records can help in making adjustments.

In the long-range plan, use average or normal yield and price. Expected normal yields were established in the land inventory. Average prices for the past 4 to 6 years provide a starting point for projecting long-term prices. However, prices may need to be adjusted to reflect changing economic conditions. Extension Marketing Specialists at land-grant universities can be helpful in projecting prices.

It is important to prepare a crop budget for the different levels of production within each land classification for owned and rented land. This will probably require preparing two or more budgets for the same crop in order to reflect different productivity levels.

Planning Forms

Farm plans may be prepared using a special series of forms that are available at many Extension Offices. There are also computer programs to assist in farm planning. Most Extension Offices that provide enterprise budgets also have planning forms, with instructions, that can assist the farmer in preparing the farm plan in a systematic manner and reduce the chances of omitting pertinent information. This series usually includes forms for crops, livestock, and labor requirements and distribution, as well as a summary form used to calculate projected net farm income.

The summary form usually has space in which to record the present and additional investment that will be required to implement alternative plans. Overhead costs—such as taxes, insurance, and interest on the present operation—are difficult to allocate to specific enterprises. Any expenses not accounted for in the enterprise budgets should be deducted on the summary form.

In order to compare alternative farm plans with the current operation, prepare a plan for the present crop and livestock program. Use the same yields and prices for both plans.

Selecting the Plan

County Extension Offices may have computer software to assist in long-range planning. But most computer programs only compare alternative plans; they do not select the most profitable plan. A number of plans may work on a particular farm, but only a few plans will lead to maximum profit.

The following procedure can help in determining the most profitable plan:

Review the Cropping System. If the farm has a medium to high percentage of good cropland, plan the cropping system first. The potential for high returns on labor and capital with good cropland is usually greater for field crops than for livestock. Study and rank the field crop budgets for each cropland classification on the basis of projected net return on land, labor, capital, and management. Give top priority to the crops that offer the highest potential return on each cropland classification. If crop rotations are necessary, combine the net returns from the crops in the rotations and compare rotations. Factors such as Government quotas and availability of markets, labor, and machinery must be considered. They may limit or eliminate the acreage of certain crops.

Tobacco, rice, cotton, peanuts, corn, soybeans, grain sorghum, and wheat are among the major field crops that offer a high profit potential. However, high-profit crops, and their ranking, vary in different regions of the country.

Specialty Crops. The potential net return on land, labor, capital, and man-

agement for small fruits, vegetables, and some specialty crops is usually much greater than that for most field crops. If markets for these products are available, these crops can be excellent enterprises, especially for farms that have a relatively large labor supply and a shortage of good cropland.

Should You Raise Livestock? On a farm with a high percentage of good cropland, the livestock program should be developed using the resources that remain after the needs of the cropping system have been met. The type of cropping program described above usually produces a large quantity of grain and a small quantity of high-quality forage, which provide ideal feeds for swine and young feeder cattle.

A well managed farrow-to-finish operation has a higher profit potential to labor and capital than a feeder pig or a finishing feeder pig operation. If capital is available, the labor distribution should dictate whether the farm plan includes a farrow-to-finish operation or a finishing feeder pig program. If there is substantial unused labor during the planting and harvesting season, consider a livestock enterprise that requires an even distribution of labor, such as a farrow-to-finish operation. If there is little unused labor in the spring and fall, consider a finishing feeder pig operation. The first 7 to 10 days after purchasing pigs is the most labor-intensive period. So, plan to buy pigs during the months when there is a large supply of unused labor.

When considering a dairy enterprise, corn silage should normally have first priority for the use of cropland. If there is more cropland than required for corn silage, the next priority should be grain or alfalfa hay production, whichever offers the greatest return on the farm

resources. Alfalfa hay usually offers the highest profit potential among the forage crops; pasture offers the lowest.

Livestock programs should not be restricted by the amount of feed produced on the farm. If the livestock enterprise cannot support the market price for the feed, livestock should not be considered.

For farms with cropping systems that produce large quantities of high-quality forage and a medium to small amount of grain, consider a Grade A dairy, a farrow-to-finish operation, and a beef cattle backgrounding program. With dairy cows, the land classification is a key factor in deciding whether to use a 5- to 6-month pasture program or a complete dry lot system. Replacement animals and dry cows should have first priority for available pasture.

In most cases, beef cow-calf programs have the lowest profit potential of the livestock enterprises. When cropland is used as pasture for beef cows, the result is usually a reduction in net farm income. Restrict the beef cow herd to land that must be in pasture, because beef cows can best utilize large amounts of low-quality forages and crop residues.

The procedures described in this chapter can provide a realistic estimate of the outlook for farm profits over a period of years, but major changes in the livestock program may require at least a year or two to reach their income potential. Therefore, when changes are made in the livestock program, actual net farm income for the first several years is likely to be lower than the projected net farm income in the long-range plan. In comparison to crop plans, it is more difficult to keep the livestock plan flexible. However, a few minor adjustments are often possible from year to year.

Review Farm Income Projections.

After selecting the preferred crop and livestock programs, determine the required labor distribution and projected net farm income. Review the proposed crop and livestock program to determine whether the enterprises with the highest profit potential have been selected. If there is unused labor, consider expanding or adding enterprises to utilize this labor.

Developing an Annual Plan

The annual plan, or short-range plan, is a yearly estimate of the crop and livestock program that will maximize net farm income for the current year. The same inventory of resources, enterprise budgets, and planning forms can be used to prepare the annual plan; however, product prices must be changed to reflect the expected market price for the month the products will be sold. If the operator participates in farm commodity programs, the price should include Government payments.

Using Computers To Improve Farm Management Decisions

Farming and ranching have never been more dynamic and competitive than they are today. Each decision a farm manager makes—or fails to make—can have a significant impact on the business. In some cases, a decision can affect a single production cycle of one enterprise, while in others it can change the direction of an entire farming operation. In this fast-paced, high-risk climate, computers can play an important part in helping farm managers make crucial decisions about their farms.

Numerous computer programs are available to help farm managers make a wide range of management decisions. Some programs are designed for strategic management—which is concerned with positioning the farm for success by matching the business's long-range direction with resources, management capabilities, the economic environment of the industry, and family growth. Other programs address tactical management, which focuses on the day-to-day, season-to-season activities needed to carry out the long-range strategic plan. (See Part III, Chapter 9 for a case

study on using computers for farm management and Part III, Chapter 2 for information on computerized accounting systems.)

The success of strategic or tactical decisionmaking depends to a large degree on managers' access to relevant information and their ability to use that information effectively in making decisions. Today's computer programs can help gather important data, provide a framework for analyzing options, and perform calculations thoroughly and accurately at a fraction of the time it would take to do the same thing with pencil and paper.

Farmers' most important strategic management decisions deal with deciding the long-range direction of their farm businesses. Each must decide what enterprise—or combination of enterprises—offers the best long-term potential, how big the business should be, the type of financing needed, the amount of debt that can be handled, and how to ensure adequate profit from the business—now and in the future. The most effective way to approach these and other strategic questions is to iden-

Richard O. Hawkins, Extension Economist-Farm Management,
University of Minnesota, St. Paul, MN

tify a wide range of options and then narrow the field to the most feasible plans. The decisions you make must be consistent with both business and family goals, available resources, the management ability available, and the risk-bearing capacity of the business and the people involved.

Budgeting for the Future: FINPACK

Several computer-based approaches to strategic and tactical farm planning have been available to farm managers for a number of years. One package called FINPACK (Financial Package) is widely used by State Extension Services. It contains a set of five computer programs designed to help farm managers make strategic decisions. Thousands of farmers have used FINPACK to help them plan for the future and to keep a firm grip on farm finances as they move toward their long-range objectives.

The FINLRB (Financial Long-Range Budgeting) program is the long-term planning component of this package. The program has the ability to compare three user-selected alternative plans for an entire farm operation—analyzing the potential profitability, liquidity, and solvency that will result from each approach. FINLRB addresses the central question, “Where do we want to be?” And it helps the manager determine whether major or minor adjustments are needed to reach the long-term objectives of the business.

Most farm managers who have used FINLRB report that it provides the most comprehensive view of their businesses that they have ever had. Many say that using the program is like having their own management consultant. While strategic planning can be accomplished without the aid of a computer, programs

such as FINLRB enable farm managers to assess a wider range of options than would be possible without them and, therefore, make better decisions.

If a long-range financial analysis indicates the need for a change in the direction of the business, programs such as FINTRAN (Transitional Planning) and FINFLO (Cash-Flow Planning) can help the manager through the transition period. These programs address the question, “How can we get from where we are to where we want to be?” They enable the manager to project cash-flow, profit, and solvency during the next 3 to 4 years or until the long-range plan is fully implemented. Even if no major business changes are necessary, these programs can help the manager develop and analyze annual plans to ensure that the operation stays on course. They can also serve as an aid in obtaining operating loans.

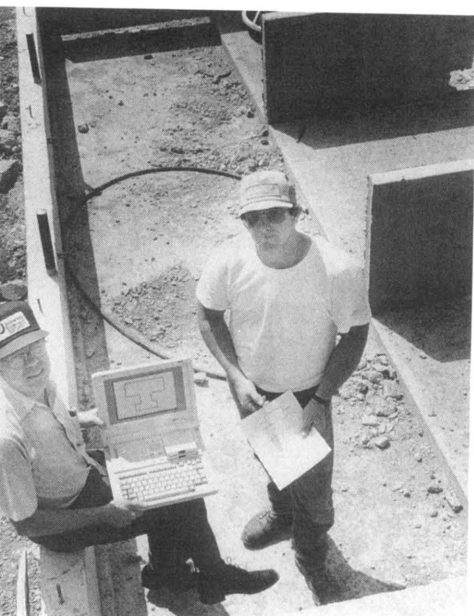
FINAN and FINANX provide year-end analyses of farm operations. FINAN generates income, cash-flow, and net worth statements for the previous year, along with reports on profitability, liquidity, and solvency. FINANX offers the same overall business analysis, but it also analyzes the performance of each of the farm enterprises. Both programs can provide up to 10 years of comparative trend data. For many farm managers, programs such as FINAN and FINANX provide a framework and discipline that helps them do the regular financial analyses that are essential to successful farming.

Tactical Decisions

While strategic management addresses long-range plans and objectives, tactical management focuses on the activities that move the farm toward those goals. Computer programs are available to help farm managers monitor or ana-

lyze production practices, develop financing plans, establish labor schedules, and create marketing plans.

Computer software can help farm managers develop least-cost ration planning programs for livestock, decide when to purchase specific lots of feeder livestock, determine whether to participate in Government crop programs, carry out capital budgeting (including acquisition of specific assets in a given time period), and many other tactical decisions. As with strategic planning, computers can speed up the decision-making process, reduce mathematical errors, and help the farm manager think critically about alternative courses of action.



Computer technology can enhance decisions for farm businesses. Don R. Day (l), Extension County Program Director and Agricultural Engineering Specialist, displays a laptop computer used in designing a syphon flush-tank system installed in a swine finishing building for Jim Aholt (r), a Glasgow, MO, hog farmer. (Photo by Jim Shaner, Extension information specialist, University of Missouri, Columbia)

Once a farm manager has developed annual and long-range plans and answered the how and when questions, the next step is to compare what is actually happening on the farm with expectations for production, marketing, and finances. Computers can help carry out the important—and time consuming—task of monitoring farm operations on a daily basis. They can also help farm managers make adjustments when performance fails to meet expectations. With this type of computer monitoring, management-by-exception rules can then be made, followed, and adjusted as circumstances change.

Having access to such a system depends on what records the manager is willing and able to keep on a day-to-day or week-to-week basis. Whether they are kept in a hand or a computerized system, they must be such that they can be summarized and analyzed at any point in time. The computer clearly has the advantage here in terms of quickly recalling structured data, calculating the desired measures, and detailing comparisons of plans to the actual outcomes in a timely fashion. Dairy Herd Improvement testing is another example: Through this testing program, dairy producers can compare actual milk production and feed costs to the expected levels on a monthly basis. Microcomputer-based dairy, swine, irrigation, poultry, and greenhouse records and control systems offer newer examples.

Computers for Decisionmaking

Of course, the farm manager must have the right kind of information for each decision, whether strategic or tactical. This includes information about the world at large as well as about the farm itself. For strategic decisionmaking, the manager must keep abreast of

general economic conditions, world supply and demand, credit policy, and so forth. In the area of tactical planning, the manager must keep up to date on current and future market prices, weather information, and other factors. While much of this information can be gleaned from the general news media, farm managers can often get information tailored specifically for their concerns through commercial computerized agricultural information networks.

When it comes to information about farm operations, many managers have been content to keep only the data necessary for income tax preparation. But in today's dynamic and competitive world, that approach is no longer sufficient. At a minimum, the farm manager must maintain production data (in a useful format) as well as information on assets, liabilities, and all credit transactions.

There are numerous recordkeeping systems for farm managers—both computerized and pencil and paper—that can be obtained from public and private sources. Computerized systems that can be used in conjunction with financial planning programs such as FINPACK have the greatest potential for improving the farm manager's decision-making capability.

Exciting Opportunities

The application of computer technology to farm management is one of the most exciting trends in agriculture today, and it is an area that is still in its infancy. Many outstanding products are currently available, and both the hardware and software will continue to improve as more farm managers use computer technology to help them make better decisions.

Unfortunately, no computer can decide which system is best for a particu-

lar farm operation. That choice requires careful matching of the technology to the farm manager's objectives. The Co-operative Extension System is an excellent place to begin; the system can provide information about what software is available and how it can be applied. Talk with farmers who are already using a computer system that interests you and who may be able to recommend reliable suppliers. Make sure that the company you buy from will stand behind its products and provide training in the use of the product. It may be advisable to try out several systems through the Extension System, lending institutions, consultants, or other sources before investing in a system.

As with any technology, the value of the new computerized farm management tools depends on how conscientiously and wisely they are used. For the system to reach its potential, the farm manager must be willing to record vital data on a regular basis and use the resulting information and analyses in making crucial farm decisions.

Computer Assisted Management: The Case of Jim and Kathy Moseley

This is the story of Jim and Kathy Moseley, who are recognized as outstanding farmers and who share both in business and in family growth and development. It is the story of how they improved their business management performance by using various computer programs.

Their Start-Up Years

Jim and Kathy were married in their senior year at Purdue University; their dream was to enter production agriculture. A friend knew of a 200-acre, high-yielding farm with old, unused hog buildings near Clarks Hill, just a few miles southeast of their alma mater. The farm was being field-rented because no one would live in the house and no one would care for the hogs. The owner wanted livestock raised on her farm, and the farm manager could not find anyone to do it. With material resources totaling \$800 (their car), the Moseleys applied for a Farmers Home Administration (FmHA) loan and made an application to rent the farm.

Neither the FmHA representative nor the farm manager was favorably impressed with Jim and Kathy at first.

However, only one other person made application to be the farm's livestock tenant. Jim prepared and reprepared cash-flow projections for FmHA and presented his case personally before the board. Eventually, both FmHA and the farm manager tentatively agreed to help the Moseleys start farming.

In the spring of 1970, with three groups of gilts (young female pigs) instead of two as they had agreed, the Moseleys began. When the farm owner visited the farm, she found pigs everywhere—including the garage. "My goodness," she said, "we've got to do something about this."

That was the day Jim learned, firsthand, the power of computer printouts. He had recently attended a Purdue University computer swine workshop where he had developed plans for adding hog buildings—buildings he would construct himself if the owner would provide the materials. Once the owner saw the computer plans, she agreed to provide the materials; Jim and Kathy did the rest.

Their Hog Business

The business now includes several entities that produce 2,500 acres of corn

D. Howard Doster, Extension Economist, Purdue University, West Lafayette, IN

and soybeans and 10,000-plus hogs annually. In a sense, Kathy controls the business in her 35-hour-per-week job as computerized check writer and bookkeeper. She also monitors physical pig performance via a swine software package.

Gary Bolander, their partner and former employee, is in charge of genetics for their gilt sales business. He is counting on the new computer data base and selection process to put their breeding practices at the forefront of their industry.

Jim, Kathy, Gary, and Wayne Bringman (former employee and crop farm partner) agree that they could not handle their information system, and they would not have produced such business successes, without their computer software. They developed much of this software with the help of their local computer consultants, George Morgan and Keith Schuman.

Crop and Machinery Decisions

Jim attended his first Purdue Top Farmer Crop Workshop at an area Extension session in 1972. He quickly learned to operate the workshop's computer linear program budget to calculate his machinery and labor costs in the available days suitable for field work to grow his crops. From then on, he has answered every crop mix, timeliness, tillage system, and farm size question by using the Purdue budget to "test before he invests" in the change. For a brief time, he even had a private account on the Purdue mainframe computer and ran budgets over the telephone from his home.

One of Jim's first major decisions was to buy a used 12-row planter. Why? He felt he got a higher percentage return on his money from used, instead of new, machinery. Also, he chose the



Kathy and Jim Moseley have become computer experts able to manage a farm business that produces 2,500 acres of corn and 10,000 hogs annually. (Photo by Purdue University staff)

12-row planter because he got it at a bargain price; he could plant his crop quickly and still do his hog chores; and by hiring extra labor and running the machinery more hours per day, he could farm extra acres when they became available.

Early on, Jim chose to get a second tractor identical to his main tractor. Then, if one broke down, by working around the clock he and his part-time help could use the other one to both prepare ground and plant the crop. At an extra annual cost of approximately \$2 per acre over the cost of a smaller tractor, he had a low-cost insurance policy.

Shadow Price Signals

From the beginning of their experiences at computer farming, Jim, Kathy, and, later, their employees and partners have responded to the computer linear program shadow price signals. The shadow price is the value of a scarce—generally completely used up—resource. In other words, it is the amount

of additional revenue you could realize if you added the resource to your operation. They have rented extra land when the rent was less than the shadow price on the worst new acre to be farmed. They have traded for bigger machinery when, after renting the extra land, they found that the shadow price for bigger machinery during the prime planting and harvest periods indicated that the extra returns would be greater than the extra costs of the new machinery.

Shadow price signals, when interpreted as values for an hour lost in the prime planting periods, are quite large. Consider the difference in expected returns from planting 12 acres in an hour on April 25 or May 1 versus at the end of the normal planting season on May 20 or 25. (Why compare the early date performance with performance at the end of the season? Because all the days between are already scheduled to be used. When you have a breakdown or otherwise get less than your expected amount of work done, you cannot make it up until the end of the season.) With expected per-acre yield differences of 20 bushels, the returns from the hour lost are $20 \text{ bushels} \times 12 \text{ acres} \times \$2.50/\text{bu price} = \$600$. No wonder everyone on the Moseley farm is sensitive to getting every machine field-ready in the off-season! Their job list looks like this:

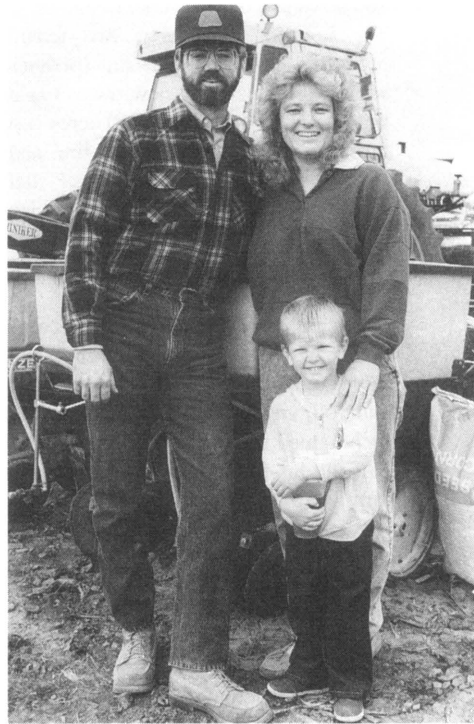
December 1: Complete maintenance of fall equipment before everyone forgets which bearings were overheating, etc.; evaluate last year's performances and decide now who is going to decide:

- Which machine to repair or replace,
- What crop mix and what seed, fertilizer, chemical recipe to use,
- Which field to do next,
- Which tractor to drive,
- Which part-time employees to hire.

March 1: Have all spring equipment field ready and tested operationally with the right tractor hooked to each item.

July 1: Complete maintenance of spring equipment. It is worth more if fixed now, even though it may be traded before next season.

Two of the former employees are now partners and some other employees are on profit-share contracts. No wonder everyone thinks, talks, and responds effectively to those computer shadow price signals. So what if the values are much smaller than \$600-per-hour the rest of the year. The opportunities are still significant for thinking and working productively.



Jim, Kathy, and son Brendon (one of six children) pause for the photographer even though it's high shadow price planting time. (Photo by Purdue University staff)

Setting Goals

One of the Moseley's special management skills is that they regularly develop both specific short-term and specific long-term goals; at the same time, they regularly develop contingency plans for quickly adjusting to surprises, both pleasant and unpleasant. During the mid-1970's, Jim and Kathy developed plans for operating their "ideal" crop farm size which was, at that time, 1,500 acres—the acreage of corn and beans that one crew could handle in a timely fashion with the largest combine.

The Moseleys were farming 750 acres in 1977 when they were approached by a professional investor who was looking for a tenant for a nearby 700 acres that he was about to purchase. The investor considered two tenant prospects. The former tenant (perhaps wanting to please the new owner) said he wanted to stay on the 700 acres and farm no other land. When Jim and Kathy informed the new owner that 1,500 acres was a near optimum size cornbelt operating unit, the new owner quickly moved to rent his farm to Jim and Kathy.

By the early 1980's, a larger combine came on the market. Jim made more computer crop budget calculations and refigured his ideal farm size. He then helped the owner find more land; Jim and his former employee and crop farm partner, Wayne Bringman, now rent a total of 1,800 acres from him.

In the mid-1980's, the Moseleys adopted ridge tillage. Ridge tillage allowed them to run two 12-row planters in the same field using the same service truck. They could also cut their labor crew; do more site-specific seed, fertilizer, and chemical applications; and, since the rows are in the same place, maintain a database of information by soil type.

Their Situation Today

Nineteen years after they started farming, Jim and Kathy have remodeled extensively and now own the house no one wanted to live in. They live in the house with their six children and their three computers. A few years ago, they were recognized as "National Outstanding Young Farmers." Jim started and continues to help lead the Indiana Agricultural Leadership Program, formed to foster and develop leadership skills in young farmers and other agricultural entrepreneurs. He is on the board of the nationally recognized Farm Foundation. He has testified for farm causes in the State legislature and in Congress. He writes a regular column in a national hog farm magazine.

The children have a computer and are computer literate. The older children are also quite familiar with the working ends of hog facility cleanup tools. They may enter the farming business after they have had significant non-farm business experiences.

Jim and Kathy will likely be adopting a livestock data entry system that does not require any pencil posting. The crop information data base will be soil-site specific. Beginning with those first FmHA budgets, continuing through their days of using Purdue farm records, to today, they have always kept monthly cash-flow projections at least 13 months ahead. In the future, financial management decisions will be based on whole-business, "what if" computer budgets run several times a day. Their software is already partly done, and these plans are listed in their specific short-term goals.

Strategies for Risk Management

Agriculture is constantly changing. Change creates unexplored frontiers of knowledge. The lack of certainty about occurrence of future events creates risk. Risk by definition is the "exposure to the chance of injury or loss." Profit can be viewed as a return for managing uncertain events that create exposure to losses. Many would contend that without uncertainty and risk, there is no opportunity for profit. Farmers of today and tomorrow need to manage this risk.

Sources of Risk

The first step in developing a risk management plan is to identify the sources of risk that may affect your farm business. Farm managers face a multitude of events that create risks, many resulting from change of one sort or another. During the 1980's, many farmers have learned firsthand about the problems of risk. Adverse weather, ranging from drought to floods, caused yield reduction in several of the Nation's major agricultural regions. These

events, combined with fluctuating export demand, resulted in wide swings in commodity prices. Declining land values, along with high interest rates, put many farmers out of business and threatened the survival of many others—especially those with highly leveraged farms.

There are many ways to categorize the sources of risk that farm business face. (See Part II, Chapter 4 for an analysis of risk categories.)

Determine Risk-Bearing Capacity

Once a farm manager has identified the sources of risk, the next step in developing a risk-management plan is to evaluate the capacity and willingness to bear risk.

The primary financial document relating to risk-management capacity is the net worth statement (also known as a balance sheet). The statement lists the farm's assets and liabilities as of a specific date. The difference between the

Gerald Schwab, Professor of Agricultural Economics, Michigan State University, East Lansing, MI, and
 G.A. Barnaby, Jr., Associate Professor of Agricultural Economics and Farm Management, Kansas State University, Manhattan, KS, and
 J. Roy Black, Professor of Agricultural Economics, Michigan State University, East Lansing, MI

value of assets and debts (or liabilities) is called net worth or equity. This amount shows the degree to which the farm debts could be covered if the farm were liquidated through the sale of its assets.

Consider this example. If a farmer had total assets with a market value of \$350,000 and total liabilities of \$178,000, the equity would be \$172,000. With that level of equity, there would be no immediate danger of foreclosure. However, dividing total liabilities (\$178,000) by total assets (\$350,000) yields the farmer's debt-to-asset percentage, which is just over 50 percent. Looking at the situation this way, it becomes clear that the farmer is highly leveraged, and a caution light should go on. By dividing the farmer's total liabilities by the farm's net worth, the result is the debt-to-equity ratio (also known as financial leverage). This example farm has debt-to-equity ratio just over 1 to 1. This leverage ratio indicates that the lender has just as much at risk as does the farmer.

Since the balance sheet measures how liquid a farmer's business is, it can be a useful tool in determining the ability of the farm business to meet financial obligations in a timely manner should an adverse event arise.

Assessing Risk

The third step in developing a risk-management plan is to determine potential loss exposure for each source of risk that can be managed. For each risky or uncertain event, the farmer must estimate the size or magnitude of the potential dollar loss, as well as the probability or chance of this occurrence. Estimates of the magnitude and probability of a potential loss enables the decisionmaker to evaluate the tradeoffs among risk-management strategies.

Alternative Risk-Management Strategies

For each source of risk that is identified, a risk-management strategy should be employed.

Development and evaluation of risk-management strategies under the chances of alternative net returns should be conducted within a risk/return framework. For example, the use of self-insurance can be compared with the use of risk-transfer mechanisms, which would reduce the level of net returns in good years but provide protection in catastrophic years. An alternative risk-management strategy is to avoid a risky situation. This approach eliminates the opportunity for profit but also the risk of loss.

The following discussion separates production strategies from marketing, but it is important to recognize that these areas are interrelated and that both have financial implications. A wise marketing strategy often starts with an assessment of market demand, as reflected in current and predicted prices.

Production and Financial Strategies

Risk management strategies for production and financial risk include diversification, spatial dispersion, enterprise selection, production management schemes, insurance, resource reserves, control of resource services, flexibility, crop insurance, and consideration of Government programs. It is crucial to base these strategies on adequate knowledge, including farm record data, the farmer's managerial expertise, and outside information sources when necessary.

Diversification. Diversification works only if the profits from two or more enterprises do not have a high positive correlation. Corn and soybeans

are often influenced in the same way by growing conditions. For example, drought will probably reduce yields of both, although the timing of the rainfall or lack thereof can influence them a bit differently because of differences in the definiteness of their respective flowering periods. But by adding winter wheat to a row-crop, corn-soybean farm, the farm becomes more diversified. Such a change may reduce risk because winter wheat yields on midwestern farms are not highly correlated with corn and soybeans yields.

However, diversification has risks, too. Diversifying into another crop or livestock enterprise may require new knowledge and skills and increased capital investment. Also, diversification into volatile enterprises, with wide ranges in earnings, would increase risk.

Control of Resource Services. Alternative methods for controlling resources can also be part of a risk-management plan. For example, farmers who rent land for cash retain all of the yield and price risk on their balance sheets. Share renting is an alternative that allows sharing of this risk with landlords. A written contract, regardless of the rental method, clarifies the responsibilities of both farmer and landlord.

Control of Machinery Services. This is another area that has important ramifications for production and financial risk management. Ownership is one method to obtain absolute control over what machinery services are offered and when. The risk-returns trade-off of owning your own machinery may be that this approach costs much more than custom hire or contracting. Contracting for machinery services may allow farmers to reduce their machinery investment and strengthen their balance sheet by avoiding new machinery debt

or reducing old debt. Machinery requirements (and the risk of yield loss) are also influenced by selection of the cultural practices, for example when farmers choose between conventional tillage and alternative tillage practices such as no-till or ridge-till.

Crop Insurance. Purchase of crop insurance is another risk-management strategy. Crop insurance provides a guaranteed yield per acre. If actual yields are less than the guarantee, crop insurance makes up the difference. The indemnity payment is based on the yield loss multiplied by a preselected commodity price. With the potential decline of federally financed disaster payments, crop insurance may become more important as a risk-management tool.

Flexibility. In evaluating risk-management strategies, the farm manager needs to ask how much of an adverse event—such as low yields, low prices, lawsuits—it would take to exhaust the equity of the business. Common mistakes in developing risk-management strategies are to underestimate the probability of occurrence or the magnitude of loss if the event occurs. The farm manager must consider the costs of doing business and family living expenses in evaluating the impact of adverse events on the farm's equity position.

Resource Reserves. Another measure of a farmer's risk-bearing capacity is liquidity. Are dollars available from current assets to meet debt obligations due in the next 12 months? One measure of liquidity is the current ratio—current assets relative to current liabilities.

An important measure for evaluating a farmer's ability to meet forthcoming cash-flow obligations is the projected cash-flow. There are two major types of risk that often cause difficulty in pro-

jecting cash-flows for the upcoming crop year: downside price risk and downside yield risk.

When developing a projected cash-flow budget, farmers should first consider the component parts of the net cash-flow statement in their risk evaluation. With crops that are included and for growers who choose to participate in Government commodity programs, the revenue per acre for the cash-flow equation is calculated by multiplying deficiency payments per bushel by the program yield, and adding that to revenue generated from the commodity price multiplied by the quantity that was produced. New loans are also a cash inflow item. Cash outflow includes the cash expense of producing the crop, principal and interest payments to service debt, and family living expenses.

Deficiency payments run inverse to commodity price, and yields can vary greatly. There is also some variability in costs and interest rates, but for most farmers input prices and quantities are easier to estimate than price and yield.

Living expenses may be adjusted slightly but it is difficult for most families to reduce their cost of living for long.

Government Programs. Farmers who, because of adverse events, produce low-yielding crops will usually have to borrow. Since many farmers are not in a position to significantly reduce family living costs, principal and interest payments, or production costs, the only sources for balancing the cash-flow equation are Government payments and new loans. In order to limit risk exposure on their cash-flow, farmers may enroll in Government commodity programs, which limit downside price risk.

Nonprogram Crops. Farmers producing crops that do not come under Federal commodity programs do not

have Government protection in the event of poor harvests or low prices. The projected yield is even more important when evaluating risk exposure.

Studies suggest that farmers, on the average, overestimate gross income by 10-20 percent when making cash-flow projections. Farmers tend to remember good years and discount bad ones. Accurate farm records of past production and financial performance are the best sources of information for farmers when projecting next year's cash-flow.

Pricing Strategies

The day the product is delivered does not have to be the day the price is established. Some commodities have several pricing strategies that farmers can use to establish their product prices before delivery. These include forward contracting, hedging using the futures markets, or buying price insurance through "put" options. These are all ways to transfer the risk of price change to someone else. Farmers with a cash-marketing strategy are carrying all of the price risk. Farmers who add a storage strategy lengthen the time in which they can establish price, but they also assume all the risk associated with storage.

Each of these strategies has certain costs, such as loss of flexibility and brokerage fees. But farmers need to determine if they can employ these strategies. Each year is different and may require a different strategy. Farmers should not lock themselves into the same pricing strategy each year. Market conditions change and farm managers must be aware of these changes and adjust their strategies to the changing environment.

Some of the pricing strategies mentioned above can also be used for purchasing inputs. Three examples of

strategies to reduce input price variability are forward purchases with contracts that specify terms including price, use of futures contracts to lock in prices for inputs traded on the exchange, and fixed-interest-rate notes. The risk-returns tradeoff again needs to be evaluated. It is possible that some farmers will be better off to self-insure. Farmers always need to consider the impact of such decisions on their balance sheets and cash-flows.

Some events represent large catastrophic losses that seldom occur; others are smaller loss events that occur more frequently. It is important to gauge how each might influence the farm business. In the end, each farmer must decide if a potential loss is sufficient to employ an explicit risk-management strategy or whether the self-insuring strategy is preferable.

Personal Strategies

In addition to the strategies mentioned above, farmers have some general financial risk-management strategies. Farmers need to maintain credit reserves and adequate liquidity. Also, when borrowing money, farmers need to maintain a high proportion of self-liquidating loans. This means borrowing money with interest rates and repayment terms that allow the debt service obligations to be paid from income generated by the activity for which the money was borrowed.

The final and perhaps most important risk management consideration is protection of the farm family's health. Farmers need to carry health insurance. Farmers handle chemicals and machinery that subject them to injury, so they need to be careful but also have some backup managerial capacity.

Realism in Planning

The total environment influencing agriculture provides no shortage of risk for today's farm business manager. Realism in planning is the key to risk management. Having an adequate set of on-farm records to provide data on past performance is a key ingredient. Only with such data can accurate estimates of risk be made. Farmers need to manage risks that can keep them from achieving their goals.

Tax Management: Taking Taxes into Account

Tax management is fundamental to good business management. Most farm managers want to minimize their income taxes while maximizing their after-tax income. To do this, you must understand the tax consequences of each of your business decisions, from planning investments and financing to managing income and expenses. You are constantly making choices that affect the amount of income tax you'll pay and the amount of cash you'll have left to operate your business. You do not have to be a tax expert, but you must be familiar enough to recognize how your decisions will affect your tax liability—this year as well as in the future. And you must be able to recognize when to call in a tax consultant for advice.

As the manager of a modern farm business, you cannot afford to consider taxes only at year's end. You have too much capital at stake; and the more successful your business, the greater those stakes are. As your farm business grows, moving you into a higher tax bracket, the tax consequences of your business decisions have an ever greater impact on cash flow and net income.

Choosing an Accounting Method

When you file your first tax return, you choose whether to report on an accrual basis or a cash basis, but once you choose you must continue to use that method. Changing to the other system requires written consent from the Internal Revenue Service. (See Part III, Chapter 1 for an explanation of accrual accounting.)

Although neither method can provide the route to all of your goals, the cash method generally provides more flexibility in managing income. But because both income taxes and Social Security payments may increase year by year, sound management calls for a careful comparison of the costs and benefits under each method. If you believe you will increase your inventory and lower your tax bracket, the cash method will reduce taxes. If your inventory decreases, on the other hand, while your tax rate goes up, the accrual method is more desirable. The following examples illustrate how the two methods work:

Expenses. Suppose you charge \$500 worth of feed and take the delivery on December 15, but the feed store does

Philip E. Harris, Associate Professor of Agricultural Economics and Law, University of Wisconsin, Madison, WI, and
W. A. Tinsley, Professor of Agricultural Economics and Rural Sociology, Clemson University, Clemson, SC

not bill you for it until January 2. Using the cash method, that purchase is deducted in January when the bill is paid. Using the accrual method, the \$500 expense is deducted in December, when the cost is incurred or accrued. But because you are required to include your feed on hand in your year-end inventory, the added cost of the \$500 purchase (recorded in your accounts payable) is offset by the increase in inventory.

Income. Suppose you raise calves during the year but do not sell any of them. Using the cash method you have earned no income. Using the accrual method you might have earned income if the value of the livestock increased during the year.

Leveling Income

The less your taxable income fluctuates from one year to the next, the less income tax you will pay over a period of years. In the short run, the timing of transactions can play an important role in balancing year-to-year income. If possible, maintain an annual net income at least equal to the year's allowable nonbusiness deductions and personal exemptions; at the same time, try to avoid extremely high taxable income in other tax years.

Reducing fluctuations in your income can help reduce tax rates for several reasons. First, the progressive tax rates cause income in high-income years to be taxed at a higher rate. Second, you cannot take advantage of yearly personal exemptions and deductions if there is not enough income for them to offset in the low-earning years. In 1989, you are allowed a personal exemption of \$2,000 for yourself and for each of your dependents. In addition, you can either take a standard deduction—\$5,200 for joint taxpayers, \$3,100 for single taxpayers and \$2,600 for mar-

ried taxpayers filing separate returns—or you can itemize if your itemized deductions would exceed those amounts.

Some strategies for evening out your taxable income are:

1. Electing accelerated cost recovery depreciation the year you buy an eligible item.

2. Electing to write off or “expense” up to \$10,000 of the cost of eligible newly purchased capital items.

3. Planning expenditures for minor repairs and improvements, small shop tools, and soil and water conservation expenses so they occur in years of high gross income.

4. Moving your annual bills such as property taxes into a year when income is high.

5. Planning sales of grain or other commodities to increase income in low years and decrease income in high years.

Strategies No. 1 through No. 3 can be employed by taxpayers using either cash or accrual accounting methods; strategies No. 4 and No. 5 apply only to cash method taxpayers.

Keeping good records throughout the year is the key to successful tax management. With up-to-date records you can determine your approximate taxable income at any time during the year. These records provide the basis for making sound business decisions.

If a preliminary check of your projected earnings and expenses indicates a high taxable income and you are a cash method taxpayer, you may decide either to delay additional sales until after the end of the year or to increase deductible expenditures before the end of the year. However, use caution before increasing expenses near the end of the year because there is a limit on the amount of prepaid farm expenses that can be deducted in one year. On the other hand, if it appears you will

end up with low net income, you could speed up sales to count the earnings in the current year, or defer expenditures until the next year.

Deferring Taxes

Current tax regulations offer opportunities to defer payment of taxes, a strategy particularly useful for taxpayers whose income does not fluctuate widely. Deferring taxes leaves you more money to cover immediate expenses, builds your net worth, and provides money to expand your business.

There are two ways farmers can defer taxes. One way is to pay the current year's taxes on the following March 1, rather than paying estimated taxes on a quarterly basis throughout the year. The other way involves shifting income into a future year by trading assets.

Rather than selling one asset for a greater amount than its tax basis and buying another asset for a similar use, you can defer the taxes that would be due, as long as the "like-kind" exchange requirements are met. Suppose you are trading in an old tractor and buying a new combine. The adjusted tax basis of the tractor (the value on which you will be taxed) is added to the additional cash you paid for the combine, raising the combine's tax basis accordingly. Any gain you realize on the tractor—and therefore any taxes you owe on that gain—is deferred. Like-kind exchanges are especially important in real estate transactions. Many farmers who sell land and replace it with other property are shocked to learn that they could avoid income taxes on capital gains by arranging a like-kind trade instead of an outright sale.

Organizing the Business

The way your business is organized—sole proprietorship, partnership,

or corporation—affects both how you file your taxes and how much you pay. As a sole proprietor, for example, you report your business income on your individual income tax return. The income of a partnership is reported on a partnership return, but the partners pay their share of income tax on their individual returns. A corporation reports income on a corporation return and also pays tax on the income. If the shareholders elect to be taxed as a small business corporation (an S corporation), however, the income is not taxed to the corporation, but is reported on the shareholders' individual returns. (See Part II, Chapter 11 on business structures.)

Corporate and Individual Taxes. Tax rates differ for corporations and individuals. Currently the Federal tax rates for individuals range from 15 percent to 33 percent. Corporate tax rates range from 15 percent to 34 percent. Corporate owners face the potential of double taxation—they are required to pay individual taxes on any dividends they receive after the corporate taxes are paid.

Social Security Taxes. Another added tax burden small businesses incur is the Social Security tax. Since Social Security taxes range from 13.2 percent to 15.1 percent, essentially the same as the lowest income tax bracket, Social Security tax management is a concern. Farmers can influence the amount they pay to Social Security by how they structure their business. Sole proprietors, partners, and S corporation shareholders are treated as self-employed taxpayers. In 1989, these taxpayers paid a 13.02 percent rate on the first \$48,000 of Schedule F earnings. In contrast, shareholders who work for the corporation are treated as corporate employees and tax is paid on their salaries. The employee's and employer's

combined Social Security tax rate is 15.02 percent for salaries up to \$48,000.

Self-employed farmers using cash accounting also can influence their Social Security earnings by producing certain goods that are exempt from Social Security taxes. Examples include breeding livestock and timber. Capital gains on land, buildings, and equipment are also exempt. Income from leasing a farm is not subject to Social Security taxes unless the landowner materially participates in the farm business.

Farmers need to carefully evaluate the extent to which they want to build Social Security benefits. Retired farmers reporting farm income, for example, continue to pay self-employment taxes, which can subject them to reduced retirement benefits. These farmers should consider their retirement goals and the Social Security consequences of their business arrangements.

The Big Picture

Remember, the object of tax management is not simply to minimize taxes. If you transact business solely to reduce taxes, you may actually lower your net income. Frequently, there is no conflict between a wise tax decision and a good business decision, but when you must make a choice, choose the strategy that leads to a larger net income. In other words, income taxes should be treated like any other cost of operating a farm. The objective of income tax planning is to maximize after-tax income. To do that effectively, keep taxes in mind as you conduct your daily business.

Expert Systems: Potential Management Aids

Farmers and ranchers are often envious of large businesses that can afford consultants to sift through information and help them make informed management decisions. A new information technology called expert systems (ES), or knowledge-based systems, offers the potential of bringing the consultant to the farm through microcomputers. ES are computer programs (software) that provide expertise to address a specific question and draw conclusions equal in quality to those one would expect from a human expert. ES also provide reasoning behind conclusions based on rules incorporated into the software. By contrast, decision aid and accounting software now produce only numbers, leaving interpretation to the user. ES provide expertise, through use of rules in the software, to interpret the results.

ES can help producers make decisions in an increasingly complex environment that requires a great deal of specialized information. Much of the present information available in agriculture does not tell decisionmakers what they need to know. Sometimes referred to as "information overload," what is provided is simply a great deal of unusable data and information. ES

can help farm managers sort through the multitude of on- and off-farm data and information, determining what is useful. Although no new knowledge is generated by ES, they do provide access to existing knowledge for the decisionmaker who needs expert help.

The use of ES applications in agriculture is best illustrated by three examples of ES presently available to decisionmakers. These three ES are diagnostic systems dealing with crop variety selection, disease diagnosis, and financial analysis.

Wheat Variety Selection

WHEAT WIZ is an expert system developed at Kansas State University for selection of hard red wheat varieties. The data base contains pedigree and release information, disease and insect resistance, maturity and winter hardiness rating, and relative yield on 180 hard red winter wheat varieties. The software can provide information about a certain variety, identify varieties that have the best resistance to specific pests, or provide a list of adapted varieties based on user-specified field location, pest problems, and cultural practices. WHEAT WIZ recommends varieties for

James M. McGrann, Professor and Extension Economist-Management,
Texas A & M University, College Station, TX

a particular field using the decision process that would be expected from a wheat specialist. This microcomputer program is available through the Kansas Cooperative Extension Service.

Soybean Disease Diagnosis

Soybean Disease Diagnosis is an expert system developed at the University of Illinois by J. B. Sinclair and Ryszard S. Michalske to diagnose soybean diseases common in Illinois. The system identifies the disease based on a user's answers to specific questions about the diseased soybean plant and its growing environment. The program expresses its final opinion in terms of the degree of confidence that the plant has a specific disease. The degree of confidence is based on the rules that plant pathologists have in the program. The program ends by providing prescriptive information on chemical and natural control for diseases. This expert system is a useful tool for Illinois soybean producers and is distributed to them through the Illinois Cooperative Extension Service.

Agricultural Financial Analysis Expert Systems (AFAES)

AFAES is a set of software designed to facilitate organization and analysis of farm and ranch financial data. I developed these programs with Kedric Karkosh and Clark Osborne. AFAES include software to be used in developing and analyzing data for agricultural financial statements, along with expert systems as it performs diagnostic analysis of the farm or ranch business' financial condition and performance. The analysis is similar to what one would expect from an agricultural financial analysis expert. This software can be used by producers, agricultural lenders, accountants, and educators.

The ES presently evaluate a farm or ranch (1) operating year performance, (2) financial condition, and (3) ability to support operating capital debt. Analysis is based on historical, current, and projected financial data. Additional ES are under development to evaluate the feasibility of long-term capital investment based on financial projections.

Participants in Development. AFAES software was developed by the Texas Agricultural Experiment Station, Texas A & M University. Cooperators in the development and evaluation of AFAES software include the Farm Credit Bank of Texas, producers in Texas, the Texas Agricultural Extension Service, private lenders, and two national task forces. USDA's Federal Extension Service supported the National Task Force with 35 members from 12 States including land-grant professionals, lenders, and software vendors. Development efforts are also closely coordinated with the American Bankers Association's National Farm Financial Standards task force that is developing accounting and financial reporting standards for agriculture. Developing ES for national efforts will help standardize financial reporting and analysis, making agricultural borrowers more competitive with nonagricultural businesses that have standardized reporting procedures.

Diagnostic Financial Analysis and Explanation. AFAES software facilitates the organization of information for current, historical, and projected balance sheets and accrual income statements. These data are then processed to generate specific financial performance ratios and trends. The expert system's rules then use this information to derive diagnostic evaluation of the business and to explain reasons for conclusions.

An example of the kind of information included in the results of an AFAES analysis is shown in the table. This example uses a dairy farm. The financial ratios and measures would be part of the report, along with a graphic presentation and another table (not shown) that defines the ratios and the acceptable range of values for each ratio. For example, the graphic results (not shown) indicated that the dairy farm had a slightly favorable financial performance.

current assets for every dollar of current liabilities. These two factors combine to put the firm in an unfavorable liquidity position. Steps should be taken to get repayment capacity in line with requirements.

- The solvency position of the firm is highly favorable as shown by the debt-to-asset ratio of .19. There is \$.19 of debt outstanding against every dollar of assets.

**AFAES Operating Year Performance Analysis of Dairy Farm
for Year Ending February 1989**

Item	Value	Change
		Percent
Liquidity: Current ratio	.68	49.43
Solvency: Debt to asset ratio	.19	-4.34
Leverage situation: Financial leverage index	.72	-
Profitability: Return on farm assets	.05	-
Repayment capacity: Term debt coverage ratio	.81	-
Net worth: Change in cost basis net worth		(+)
Cash-flow: Annual farm cash income minus cash expenses	\$41,014	

The program explains each one of the factors which were evaluated. Examples of the interpretation of financial factors provided by the program are given below.

- During the operating year analyzed, the firm had a positive cash-flow of \$41,014.
- A return on farm assets of 5 percent puts the firm in an acceptable profitability position. Each dollar of farm assets is generating \$.05 of net income. Profitability should be monitored to insure that it increases.
- Although a positive change provides evidence that the liquidity position of the firm improved, the current ratio of .68 indicates that there are some liquidity problems. There are only \$.68 of

- The term debt repayment capacity indicates that there is only \$.81 of cash for each dollar of term debt repayment capacity required. Immediate action should be taken to get repayment capacity in line with requirements.

AFAES software will greatly enhance the use of farm financial data by farmers and ranchers who often do not have the expertise to fully utilize their accounting and financial data. The software facilitates consistent analysis and borrower comparative analysis using standardized information by type of farm. This software can be integrated into presently available accounting and financial analysis software to add the "human expertise" analysis component. The software is designed for use by

farmers with minimum assistance from Extension Specialists or consultants. AFAES software is available from private software vendors that have licensed the software for sale or through a licensing agreement with the Texas Agricultural Experiment Station.

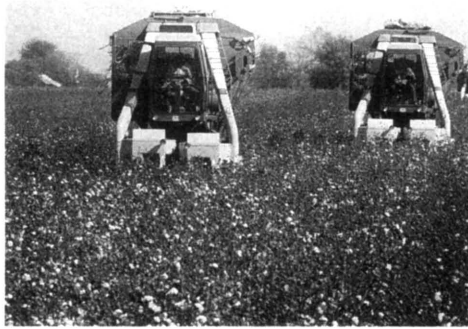
Research Efforts

There are a large number of research efforts in land-grant institutions to develop ES applications for agriculture. A survey of universities in 1986 identified 28 universities with 128 ongoing activities in research and Extension to develop ES, and a partial survey in 1988 identified 59 applications. Major topics of management applications include crop and livestock production, financial analysis, marketing, and natural resource management. Diagnostic and prescriptive advice on pesticide selection, variety selection, pest management, and financial performance dominate the functional areas of application. Other ES are available for grain marketing, dairy cow reproduction problems, and rice herbicide selection.

Researchers at Texas A & M are developing comprehensive farm level ES for cotton (COTFLEX) and rice (RICEFLEX) to address questions that range from herbicide selection to agriculture policy evaluation. A Mississippi State University-Economic Research Service effort is developing and field testing a cotton management program (GOSSYM-COMAX) that combines a plant growth simulation model (GOSSYM) with a diagnostic expert system (COMAX).

Input Selection Expert System

ES that help with decisions on inputs such as fertilizer, insecticides, and herbicides offer the greatest opportunity for



COMAX tells cotton farmers when the plants are mature enough to harvest. (USDA Photo by Dave Warren, 067-7-36)

ES management aid applications. As agriculture moves toward a more environmentally sound production system, ES will play an increasingly important role. ES can facilitate pesticide selection with rules that address regulatory labels, costs, application method, and safety. ES could even provide information to properly regulate application machinery. Expert system instructions could be combined with field mapping and machinery controllers to regulate planting population and pesticide use as planters and applicators move through the fields.

Success of ES for input selection will depend on how complete the information is to support the decisionmaking rules. A major cooperative effort will be required among input suppliers, researchers, Extension Services, and regulators to insure that ES are comprehensive and information is updated on a timely basis. Users will have to be conscientious to see that ES are properly adapted to their decision environments. Successes in developing ES for agriculture to date have been associated with systems designed to address very specific decisions. The result of successful ES for input selection will be

farm managers who are better informed on the use of inputs, as well as a more cost-effective, sustainable agriculture.

Training and Education

ES have proven to be excellent tools for training decisionmakers. ES should greatly enhance the educational capabilities of professionals such as Extension agents and consultants who must address a wide variety of problems. ES can help extend the capabilities, efficiency, and transfer of knowledge from a limited number of specialists to larger farm and ranch audiences. To make effective use of ES, farm and ranch managers will need good production and financial records.

Future of Expert Systems

Because of an increasingly complex decision environment, managers will use consultants to assist in areas of tax, finance, legal matters, and production input use. ES will be a lower cost and more convenient way to complement and substitute, to some degree, for human experts. ES can add so much to the present management decision aids through explanatory powers that most agricultural software in the future will have some component of expert system technology. ES will be one of the knowledge delivery technologies of the 1990's.

ES will not replace the farm or ranch manager who is required to analyze data and formulate strategies. However, ES tools will greatly facilitate access to information and analysis.

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From Boom to Bust and Back Again: A Farm Family Rebuilds

The agricultural boom of the 1970's produced many farm management success stories. Fortunes were made with the help of low interest rates, galloping inflation, and advanced production methods. Management was easy. In fact, few farmers had to manage in the strictest sense of the word. But in the 1980's, the boom suddenly turned into bust. The decline in the farm economy caused many farming operations to collapse.

This is the story of a Tennessee farm family that rose with the boom, fell with the bust, and survived and rebuilt by incorporating effective management strategies. (Although the family's real name and location are not used, the story is true.)

Mr. and Mrs. Farmer and their two small children enjoyed the prosperity of the late 1970's and early 1980's. Their farming business included 400 acres of corn, soybeans, and wheat, along with 20 sows in a farrow-to-finish operation. The Farmers had good equipment, sufficient buildings, and on-farm storage; and they owned most of the land they farmed. Mrs. Farmer stayed home during the early years with their young children.

But in the early 1980's, signs of financial stress appeared. There were cash-flow problems, suppliers were pressing, and their two long-term creditors were concerned. In 1985, the creditors and the Farmers mutually agreed to a foreclosure, with some debt write-off. The family's net worth had declined rapidly—to a negative \$250,000. Bankruptcy was imminent.

With loans from their family, the Farmers were able to hold on to their homestead—small in acreage, but it was their home—and support buildings, including the swine buildings. After making an inventory of their resources and discussing their situation with an Extension Agent, the Farmers decided to go back into the hog business—selling feeder pigs for cash flow. They also added tobacco to benefit from the high per-acre return.

They also made adjustments in their family lifestyle. Family labor was utilized heavily on the farm. Both Mr. and Mrs. Farmer began outside employment on a temporary basis. To be sure, times were tough, but their determination was keen to overcome these adversities.

Extension Agent, Agricultural Extension Service, University of Tennessee

The key factor in making the new farm operation work was the Farmers' adoption of a more disciplined and effective approach to management, which they learned through participation in the Extension Service's MANAGE program. They began to analyze each farm decision in a more businesslike manner than they had in the past. Every change in the farm operation had to produce a positive outcome—with a low risk possibility.

This in turn required them to keep better farm records—enterprise records, production records, cost records—and to pay attention to detail as they never had before. Business decisions were based on effectiveness of production instead of on volume of production. In short, the Farmers realized that the success of their farm depended on their ability to be good managers as well as their ability to raise lots of hogs.

Plans were established and followed. If additional land was needed for crops, the Farmers rented it on a share basis. Existing facilities were utilized, with low-investment huts used for any expansion. Older, less expensive equipment was added on a piece-by-piece basis.

At a local Extension program on farm management in late 1987, the Farmers had the opportunity to analyze their operation and consider alternative plans using FINPACK, a computerized farm business analysis program. (See Part III, Chapter 8 for more information on FINPACK and Chapter 9 for a case study of a farm family using a computer to improve management.)

The plans indicated that the farm operation was ready to expand. The hog business was good, and their long-term plan called for a gradual reentry into a farrow-to-finish enterprise. But to expand meant that the Farmers would have

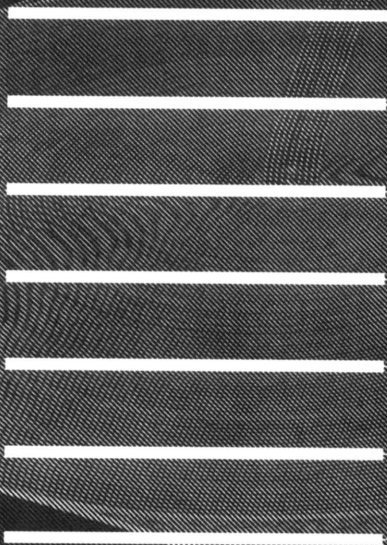
to seek a loan to build a feeding floor. Given their past credit experience, they doubted they would be able to find a lender.

However, they decided to give it a try, and with the printout from the FINPACK analysis in hand, they approached an intermediate lender. The lender was impressed by the changes in their management style and the dramatic improvements in the business that had been accomplished through effective labor and family sacrifices. Based on the farm plans developed with assistance from the Extension Service, the loan request was approved.

The Farmers built the new feeding building, eliminated some acreage and crops, and concentrated on expanding the hog operation as planned. In short, they have succeeded in rebuilding. Mrs. Farmer has continued her part-time employment, in part because she enjoys her job. There appears to be less stress in the family.

The Farmers have praised Extension Service's MANAGE program and recommended it to other farmers, who have also received substantial benefits from the MANAGE farm management educational program. In the past year, the Farmers subscribed to a commercial recordkeeping system. Production records from breeding to market are being incorporated. Extension educational programs on production and management are an integral part of their plan.

Part IV



Resources:

Land, Labor, Capital, and Management



Land Purchase and Lease Decisions—Taking the Long View

Agricultural real estate and the real estate market are different from many other types of investments. Each tract of land is different, if only in location. Each attribute of a farm can be studied by the prospective buyer, and the discounted future benefits can be recognized before purchase. Each buyer has his or her own mental calculus for assessing property value.

Farmers tend to buy land with the expectation of holding and farming it indefinitely. The mindset for holding farmland is entirely different from that for stocks and bonds. Stocks are bought and sold frequently for both capital gain and current income. If land is purchased as a long-term investment, mortgage payments have to be made from farmland income or from outside sources rather than relying on increases in land prices.

Because of these characteristics, organized markets have never developed for real estate as they have for stocks and commodities—where transactions can be conducted in a matter of minutes or seconds. Thus, land values are highly subjective and influenced by nonmonetary considerations such as the

desire for security and prestige. However, anyone who plans to buy or sell farmland needs to make an objective assessment of the monetary value of the land in question—separate from the emotional joy of ownership.

Boom and Bust

For a long time, many landowners, including farmers, thought that farmland always increased in value and that they could expect substantial capital gain over the years. That is what happened between 1932 and 1982, a span when hardly a year went by without land prices going up. But those who invested in farmland in the late 1970's expecting ever-increasing prices to help pay for farmland were shocked in the mid-1980's by the worst short-run decline in land values in this century.

Farmers generally have been willing to pay more than outside investors for farmland, because farmers could put their own labor return into the equity or mortgage payments. This has resulted in a current rate of return of land alone that has always been less than the mortgage rate of interest. The return rate has normally been in the range of one-

John T. Scott, Jr., Professor of Farm Management and Production Economics, University of Illinois, Urbana, IL



Most farm real estate is considered by both investors and users as a long-term investment. (Photo by Tim McCabe, IL-2197)

half to two-thirds of the mortgage rate. This rate relationship persisted until about 1972, when inflation, interest rates, and optimism about demand for food drastically changed the picture.

In the spring of 1981, at the peak of the land boom, at least 80 percent cash downpayment would have been required in order for the land share of net income to make mortgage payments on the balance, with no return on equity. Although this made no economic or business sense, many mortgage lenders continued to make loans on "current asset" values rather than cash-flows. Such loans were frequently as high as 70-80 percent rather than the 20 percent that would have made financial sense based on cash-flows. Farm incomes did not rise as expected, and the ensuing debacle caused land prices to fall by more than 50 percent in many regions.

Ownership vs. Renting

Most farmers would rather own their own farmland than rent. Ownership gives farmers a permanency that renting on a year-to-year basis cannot. Ownership may allow expansion of the farming operation in areas where renting additional farmland is difficult.

Ownership also allows greater management control over fertility, soil conservation, and building investment. And ownership confers greater prestige in the community. Theoretically the higher price not based on monetary return represents the extra value placed on ownership.

The Farmer's Advantage

Farmers have several advantages over outside investors when it comes to buying land in their area. If the new property is within a reasonable distance of the home farm, it may be legitimate for the farmer to estimate a higher land value from the use of farm machinery and labor than an outside investor could justify based on rent alone. Farmers have two other advantages: They are likely to know more about local farm productivity, and they can find out about land for sale in their region that outside investors know nothing about.

However, when a farmer buys land in the next county or another State, much of that advantage is lost. Then the farmer must make as thorough an investigation as an outside investor.

Deciding Whether To Buy

Given that a farmer is willing to pay more for farmland than a nonfarming investor and is willing to pay more for an adjacent tract than a farmer who is not adjacent, the next step in the decisionmaking process is to determine whether the farmer can afford to purchase the property and whether it is a wise investment. Self-imposed limits that affect the decision may include alternative uses of limited resources, family considerations, and the lowest amount one is willing to accept on monetary return to equity. Outside factors which impose limits include the market rate of interest, the return gen-

erated by the property, the amount a lender will loan on the property, and loan terms.

A recent survey I conducted of appraisers and brokers revealed that in more than half of all land sales, the land is purchased with cash—and no external financing. In such cases, self-imposed limits are the most important.

The Financial Approach

If a farmer must get outside financing, the cash-flow generated from land or outside income must be sufficient to cover the mortgage payments. When financing is necessary, a logical decisionmaking framework is needed to place a price limit on the farm for the person making the investment. One approach I developed several years ago is called the “Financial Approach to Appraisal” or the “Financial Approach to Valuation.”

Suppose, for example, that you think you have enough money to pay half in cash on a farm that is coming up for sale and your loan officer will loan the other half on a 20-year amortized mortgage with a 12 percent fixed interest rate. For the past several years, your money market funds, which you would have to draw out, earned as little as 4.8 percent, but now they’ve gone back up to 7.75 percent.

You contemplate what you’re willing to accept for your equity if you put it in farmland. You think about the advantages of owning more land and how you could farm it with the labor and machinery you already have. You come to the conclusion that you would be willing to take your money out of the money market fund to purchase farmland even if you only got 5 percent on your equity. You might also be hoping for some capital gain, although you remember what a serious error this was for some people who bought in the 1970’s. So you decide that even if your equity return dropped to zero some years, the return from the farmland had to be enough to make the mortgage payments.

To determine whether you made the right decision, use the table below.

If the expected net return would be \$80 per acre after all expenses were paid, and this was expected into the foreseeable future, then the most the farmer should pay for this land would be \$80 capitalized by 8.7 percent. This is the return required to pay the mortgage and produce the desired 5 percent return on equity. This would be $\$80/.087 = \920 per acre. Even if the farmer is willing to forego any current return on his or her equity funds, accepting the possibility of increased land

Financial Approach to Appraisal			
Source of funds	Proportion of fund source	Rate of return required on funds	Weighted rate of return
Percent			
Equity	50	5.0	2.5
Mortgage	50	12.4*	6.2
Required return		8.7	
Less rate of increase in income		2	
Required return adjusted for potential income increase		6.7	

*This is the mortgage rate amortized over 30 years with an interest rate of 12 percent.

value as the equity return, it would not make sense to pay more than \$1,290 per acre ($\$80/.062$ required to meet the mortgage rate).

Regardless of whether the market price for the land (what someone else is willing to pay) is higher or lower than the price indicated by the "financial approach," this method provides a logical and necessary way to consider how much you can pay for land given your financial situation and the amount of return acceptable on your own funds. It also allows "what if" scenarios to be calculated easily and quickly. If the net return were expected to increase each year, say at 2 percent per year, due to increase in yields, lower costs of production, and/or greater demand for the products sold, then the rate of increase would be subtracted from the required return to obtain the required rates after anticipated increase in returns. With a beginning net of \$80, the land value then becomes $\$80/.067 = \$1,194$ per acre; however, the farmer would have no return on equity on a current account basis in the first year.

The Leasing Alternative

If the ownership cost of land or the market value of land available to add to the farming operation is too high after considering all logical financial alternatives, then the leasing market for land should be investigated. If land is available to lease, then renting may be more profitable than buying, at least on a current basis. There are many advantages to leasing. One is that lease cost is usually less than ownership cost. A more important factor for many is that leasing may save restricted cash funds that would be needed for a down payment to buy land. Funds will not be depleted or taken out of operating funds or other alternative uses where yield of

money is normally higher than might be realized in land.

Crop-Share Lease. There are several rental arrangements. The oldest is the crop-share lease, which originated more than 2,000 years ago. The crop is shared between the farmer and the landowner, with the farmer furnishing the labor, power, and machinery to operate the farm and the landowner furnishing the real estate and paying the taxes. Crop-share leasing is still predominant in some areas. In a modern crop-share lease, the lessor and lessee usually share many of the variable costs such as seed and fertilizers. Based on microeconomic theory, the variable costs in producing the crop—seed and fertilizer being the most obvious—should be shared in the same proportion as the crops are shared. The crop-share lease allows for sharing of yield and price risk, the two major risks which most farmers face.

Cash-Rent Lease. The cash-rent lease, where the lessee normally pays the lessor a fixed amount of cash for the use of the farm for 1 year, is a common lease form in many areas. The fixed cash rent, at least in the short run, is more risky to the farmer than the landowner. The landowner risk is collecting the rent, especially if the rent is too high and becomes a risk or a burden to the tenant. In some areas, a few landowners, notably public institutions, let their land at a cash-rent auction, which is one way of gauging the market.

In Europe, the lessee has longer term rights to land that are established by law, and rent is often fixed for a long period or set by local farmer committees. In the United States, while the lease is normally written for 1 year, in practice there is a much longer tenure. It is not unusual for a child to follow a parent as a tenant on the same farm. There is a high degree of trust between

most landowners and their tenants. Even in today's more legalistic and business-oriented climate, a survey on leasing which I recently conducted showed that only about 30 percent of the farmers renting land on a crop-share lease had a written lease.

A longer term lease may benefit both parties, especially where soil fertility improvements, soil and water conservation, or other environmental controls and improvements are needed. Many of these improvements are made partly with the tenant's resources and labor. The benefits from such improvements are forthcoming over a longer period of time; thus, for tenants to do this work and reap some benefit, they must have longer lease periods.

Other Lease Types. There are many other types of leases, and each has its place, but they make up a small proportion of all leases. The bushel lease stipulates that a fixed number of bushels of a commodity be delivered by the farmer to the landowner. This probably has the highest risk factor to the tenant, because variation in yield is generally higher than the variation in crop value. With a variable-cash-rent lease, the rent is usually tied to the land price index or the index of prices received by farmers.

With the gross-share net rent, the landowner receives a share of the crop but pays no expenses other than direct real estate costs such as building repair, insurance, and real estate taxes. In areas where this lease is found, the share of the crop is always lower than the share which the landowner would receive when the landowner also shares in the variable expenses. Each case needs to be budgeted out, but in areas where the cost sharing crop-share lease is 50-50, the gross-share net rent is usually about one third. Based on the economic theory that variable costs should

be shared in the same proportion as the product is shared, I do not recommend this lease.

Before renting additional land, it is always best to make the same investigation of the soils, erosion, productivity levels, base acreage under the Agricultural Stabilization and Conservation Service programs, and yields that you would make if you were planning to buy.

Markets for Buying and Renting

As one would expect, there is frequently a strong relationship between the land market and the rental market. The ratio of rent to value was relatively constant from 1935 to 1970, but the ratio began to fluctuate as land prices became more erratic after 1972. The change in land prices over the past 15 years was due to many factors which did not affect the rent generated by the land. Thus, the rent ranged from a low of about 3.75 percent of farmland value in 1980 or 1981 to a high of about 10 percent of value in 1985 or 1986. Yet rent on a dollar per acre basis was essentially flat from about 1975 to 1989, allowing for year-to-year variation in yields and commodity prices.

When land prices are high, it is usually better to add land to the farming operation by renting, regardless of how much you need to bid to rent. When land prices are high, rent bids are about one-fourth the cost of ownership. When land prices are low, ownership cost is likely to be much closer to rental rates. This is the time to add to the farming operation through purchase.

Managing Water: Economics of Complex Systems

To the many American farmers in the Midwest and East, water management for crop production is often left to the whims of nature. This *laissez faire* attitude may be sufficient in those areas experiencing regular and predictable rainfall. But in other areas of the United States, drought and reduced product quality are highlighting the need for water management—mostly through the use of irrigation. In the arid and semi-arid West, the shortage of water available for irrigation limits production. Without water, production of crops is not practical even with abundant land and favorable climate. Water costs, irrigation system costs, environmental concerns, and the complexity of matching available water to plant requirements all dictate sound water management decisions.

Planning, implementing, and controlling are fundamental to successful water management—as they are to all aspects of farm management. Equally important is the understanding that water is a limited resource and that crop production, water management, and water delivery (irrigation) cannot be considered separately.

Crop Management Systems

A crop management system is a set of crop production activities used in a specific area. Crop management systems include the activities of seasonal land preparation; crop seed selection; application of fertility supplements; and crop protection from weeds, insects, and disease. A crop management system also may include the physical application of water to supplement soil moisture.

Water Management Systems

Water management systems are those parts of crop management systems that modify soil moisture to enhance plant growth. A water management system includes the use of tillage practices and crops based on their suitability for the local environment—including the availability of water. Practices such as fallow cropping, contour cropping, terracing, and land drainage directly increase or decrease soil moisture. Plant varieties and planting dates determine water needs. A water management system also includes some method of obtaining and distributing water. This method commonly involves an irrigation system;

James C. Wade, Extension Economist and Associate Professor,
The University of Arizona, Tucson, AZ



Water costs, irrigation system costs, and the complexity of matching available water to plant requirements highlight the importance of sound water management for crop production. (USDA Photo by Ron Nichols 89BW0917)

however, “water harvesting” can supplement irrigation water by using land shaping techniques and soil conditioning to direct water to plants.

Irrigation Systems

Irrigation systems are techniques and technologies that capture, distribute, and add water to the soil to increase plant production. Traditionally, irrigation systems consisted of ditches designed to use gravity to move water from one location to another. This is still a popular irrigation method in some areas, although electric motors and combustion engines

now make pumping irrigation water at high pressure through pipes and sprinklers commonplace.

New low-pressure irrigation methods such as drip and trickle systems that apply limited amounts of water directly around individual plants have become popular. System capacity, energy requirements, and water quality and quantity requirements are factors the decision-maker must consider when planning an irrigation system.

Planning and Implementing Water Management

Managing water requires recognizing the crop’s water needs and devising a plan for addressing those needs. In the arid West, crops almost always face a level of risk because of inadequate or poorly distributed rainfall that requires additional water as an input. In other areas of the country, risk levels are lower, as the potential losses from not providing additional water are not as great.

Of equal concern is the availability of water. Many areas have soils and climate suitable for growing many types of crops, but seasonal rainfall limits choices. The problem is compounded by a lack of water available for irrigation. In some cases, water may be available at a prohibitive cost or of an unacceptable quality.

Once a plan is developed, the farm manager must consider the financial aspects of planning for water management. These include evaluating the long-term capital needed for investment in irrigation wells (where appropriate), delivery pipes or ditches, and water application technology, as well as determining whether the plan is likely to generate enough cash to pay off borrowed capital. Flexibility should also be considered. Can crops and water application rates easily be altered?

Sources of Reduced Water Use Efficiency

Water sources

Well equipment

Engine or motor

Energy type, timing, reliability, cost

Delivery ditches

Dirt ditches/deep percolation

Evaporation

Leaks in pipes and ditches

Application systems

Run-off

Nonuniformity/placement

Evaporation

Deep percolation

Crop

Bad timing

Loss of control

Competing plants and insects

Water not available in plant root zone

Controlling Water Use

Water management deals most directly with controlling the water use of a given crop and irrigation system. Inefficient water use can be found throughout an irrigated farm (see table). Water use must be measured and evaluated against standards accepted by the manager, and actions must be taken to correct deviations from the standards.

Assessing water use standards is particularly difficult. The amount of water applied to crops can be a standard; but is the water being applied in such a way that the farmer's financial and personal goals are being met? Crop yields often become standards. Farmers may apply water and/or water application technology at levels

that maximize crop yields but do not provide satisfactory financial returns.

Structural corrections—construction, repairs, and maintenance of system components—must be evaluated for economic feasibility.

The major control variables for water management are quantity and timing of water applications. Measurement of soil moisture content or, alternatively, plant stress allows a manager to anticipate irrigation needs and apply water at the appropriate time. The quantity applied is dependent on the irrigation system's design. Most often an irrigation system applies a given amount of water during a specified period; water management adjusts the interval between applications.

Technological advances in irrigation increase such control but often require large capital investments.

Choosing to Manage Water

Water management, including all of the components of crop and irrigation systems, follows the principles of economic decisionmaking—benefits and costs. The simple question for any decision is: Do the benefits to the farmer outweigh the costs of the farmer? And, of course, these benefits and costs must include consideration of the tax implications.

Perhaps in no other area of farming is this idea more clearly demonstrated than in fully irrigated agriculture. Putting aside the questions of social benefits (from having an abundant food supply) and costs of irrigated farming, a farmer's investment costs in irrigation systems are usually clear and direct (including the potential subsidies). A good farm manager must evaluate such potentially large investments, recognizing that all production elements—land, labor, capital, and management—must be paid. Loans for such systems are often large and difficult to get approved. The potential for success must be very good for lenders to provide the necessary funds.

Day-to-day water management is no less important. An inefficient ditch, well, or application system increases costs and reduces potential profits. But again, the tradeoff may be exchanging the "best" for "good." All personal costs must be considered; thus, the activity that uses the least water or produces the highest yields or profits may not be chosen.

A Complex Process

In most farming areas, water is costly (if available) to obtain and apply. Water management is a complex process that includes knowing each field's soil and

water quality and recognizing the importance of the interactions of fertilizers, water, and plants. The process is dynamic. If crop water needs are met appropriately, the crop will thrive and yields will be high. If not, yields will be reduced. The tradeoffs among limited and costly resources is the basis of economic management.

Farmers need education and training to properly manage such complex systems. Water management through irrigation has the potential to increase and assure average yields in most areas by eliminating the risks of periodic or long-term drought.

All crop and management techniques have costs and benefits affecting short-term profitability and long-term survivability of the farm. Adaptability and change are paramount in the increasingly competitive business of agriculture, and reducing production cost is essential to long-term survival of competitive firms. Water as a direct input applied through some type of irrigation system is often expensive. Effective decisionmaking for water management is required to develop profitable enterprises.

How To Obtain and Use Agricultural Credit in the 1990's

Sound use of agricultural credit is a two-way street affecting both borrower and lender. At times it may seem to the borrower like walking a tightrope. The individual seeking credit must be prepared to demonstrate to the lending institution that the proposed financing is feasible.

In any borrower/lender relationship, it is essential that the borrower supply up-to-date financial and production records to provide an understanding of the business. Production records include live-stock records such as Dairy Herd Improvement Association (DHIA) for dairy, production and weaning efficiency for livestock, and yields and costs for crop production. Financial statements include a balance sheet and an income statement, as well as historical and projected cash-flows. If possible, 3 to 5 years of financial and production data are desirable. Many lenders today are asking for income tax returns for 3 years. (See Part III for chapters on farm recordkeeping and accounting.)

On the other hand, it is the lender's responsibility to analyze these documents in a logical and systematic manner. This

will result in a timely decision on the borrower's credit worthiness. While good financial management is the primary responsibility of the borrower, both lender and borrower must use sound credit practices.

Selecting a Lender

Selecting a lender or lenders is a critical aspect of financial management. A farm operator should shop for credit and investigate several sources before making a final decision. As a borrower, you must be prepared to make judgments, as well as to be judged. Here are five guidelines to use in rating the quality of the credit service.

1. *Select a knowledgeable lender who understands agriculture today.* Agriculture, undergoing rapid technological change, is beset with unique problems and opportunities. The lender must be able to demonstrate up-to-date knowledge of problems, trends, and modern agricultural practices specific to the particular enterprise and geographic region. Choose a lender whose track record shows an understanding of its farm customers and a genuine interest in and concern for

David M. Kohl, Professor, Department of Agricultural Economics, Virginia Polytechnic Institute and State University, Blacksburg, VA, and Alan Tubbs, President and CEO, First Central State Bank, Dewitt, IA

the customer's welfare and financial progress.

2. *Select a lender who has experience in agricultural credit and a commitment to agriculture.* In recent years, a depressed agricultural economy has caused some lending institutions to exit agriculture. As a borrower, examine the lender's farm loan experience. Check its reputation by asking other farmers. Assess the lending institution's commitment to agriculture and service by looking at its track record during periods of adversity. Is the lender experienced in dealing with the programs you are involved with or interested in, for example Agricultural Stabilization and Conservation Service (ASCS) and Farmers Home Administration (FmHA) programs?

Become acquainted with a person in authority in the institution, and maintain a direct link with one or more people there for information and advice. By doing so, you can monitor the institution's financial stability and general attitude toward agriculture. Remember, senior management strategy influences an institution's lending policies.

3. *Choose a lender who is willing to discuss lending policies and terms and provide prompt action to credit requests.* While investigating a source of credit and related services, compare the terms of credit with other available sources. Remember, total credit charges are more important than interest rates alone. Credit expenses, such as up-front charges for farm loan application and closing fees, can add substantially to credit cost. Examine fixed- or variable-rate interest options and determine the associated costs, benefits, and risks.

Arrange repayment terms flexible enough to prevent undue hardship in case of special needs or emergencies. Payment schedules should mesh with the

anticipated cash-flow generated by your farm business. For example, a dairy farmer may want monthly or quarterly payments, but a cow-calf or grain producer may prefer only one payment per year after the sale of the calves or grain. Investigate the privilege of prepaying without penalty.

Timely action on loan requests should be a high priority in selecting a lender. A delayed credit decision can hinder crop and livestock production schedules, and ultimately affect cash-flow and profits. Keep in mind, however, that the lender must have adequate information to make a sound credit decision.

4. *Choose a lender who has the capacity to meet anticipated credit needs.* Agricultural businesses frequently need large sums of capital. This could create a roadblock in the credit process. Some institutions may have a statutory limit placed on the amount of credit they can extend to any one individual or business.

5. *Select a lender who has a reputation for honesty and integrity.* In our market-based economy customer service is essential in doing business. Therefore, seek a lender familiar with and skilled in financial and production analysis. Periodic visits by the lender to your farm or ranch show sincerity and concern, and enhance the lender's understanding of your business. Have the lender explain all services offered in practical and understandable terms.

A lender with a reputation for honesty will judge potential borrowers on the same basis. A strong borrower/lender relationship is one of mutual confidence. Maintaining confidentiality of information and objectively evaluating a situation (in other words, being able to say "yes" or "no" to a credit request and backing the decision with facts) are strong attributes to consider in selecting a lender.

Preparing for the Lender

After selecting a lender, prepare for the credit request by following these five tips in negotiating a financial package with your lender.

1. *As a borrower you must provide current, accurate financial statements and supporting records.*

A current balance sheet with supporting schedules and inventories is essential. A record of earnings (usually an income statement) and a projected cash-flow for your business are also needed. A 3- to 5-year projected cash-flow period may be required, especially if you are anticipating a major change in your business. A good set of farm records showing production plans, short- and long-range goals, and procedures for implementation and evaluation will enhance your chances of selling your credit to a lender. In approaching a new lender, be prepared with all of these schedules, but find out specifically what financial information that particular banker wants.

Most lenders are accustomed to balance sheets and income statements prepared or compiled by a certified public accountant when dealing with commercial and industrial borrowers. An increasing number of farms and ranches are using professional services for their farm records. A common and significant difference between records prepared by an accountant and records prepared by an individual is valuation of assets on the balance sheet. Accountant-prepared balance sheets commonly value assets at cost less depreciation, while individuals commonly use cost or an estimate of market value. The issue of asset value is important because asset value variations also show up on the right hand side of the balance sheet as changes in net worth and they also affect leverage ratios such as percentage equity or debt/worth. If you do not use accountant-prepared state-

ments, most lenders will desire a conservative estimate of asset values.

There are a number of excellent farm record systems available, many of which run on a microcomputer. Some will coordinate and reconcile income statements to balance sheets, ensuring consistent valuation resulting in a better tracking of earned financial progress.

2. *Arrange credit in advance.* Lenders do not like surprises. Thus, do not inform your lender of a major decision after the fact. This can destroy trust and credibility and make future credit more difficult or impossible to obtain.

3. *Allow your lender time to review your plans and make suggestions.* Major purchase decisions are sometimes made on the basis of emotion rather than profitability. A lender can provide objectivity and counsel in reviewing your credit request. Remember, explaining your goals and plans builds confidence and trust, which strengthens your working relationship.

4. *Keep your lender informed.* Even the best of businesses face adversity that reduces the ability to repay. Inform your lender as soon as possible of changes in plans or unforeseen problems that will interfere with making loan payments. Remember, communication is the key element in the initial request and throughout the credit process.

5. *Maintain a high level of integrity.* If you expect a lender to be honest and aboveboard at all times, then the same will be expected of you. Inaccurate information and failure to honor commitments will jeopardize the borrower-lender relationship.

Managing Credit Use

Once credit is obtained, properly managing the credit becomes a major challenge in your business. Three basic financial statements—the balance sheet,

income statement, and cash-flow statement—are tools used to monitor the financial strength of your business. When compiled and supported by accurate financial information, these tools can provide the support needed for many of the strategies and financial decisions you face.

Any business—whether it is an agribusiness firm, farm, corporation, or small business—must meet certain criteria if it is to be successful, particularly if credit is used. A successful business must exhibit strength in repayment ability and capacity, liquidity and solvency, and profitability and financial efficiency. Coincidentally, the lender's cornerstones of sound credit, the five C's, encompass the same qualities:

1. Character (honesty, integrity, and management ability),
2. Capacity (repayment ability and profitability),
3. Capital (liquidity and solvency),
4. Collateral (minimizing risk to the lender), and
5. Conditions (for granting and repaying the loan).

Both farmer and lender can assess the financial status of the business with these criteria.

Any analysis of the use of credit is only as strong as the quality of financial and other information provided. Circumstances such as size and mix of enterprises, costs, values, commodity prices, collateral values, type of business entity, and time of year can all affect interpretation. Also, be cautious; do not base final interpretation on any one factor but rather on a balanced comprehensive approach. In short, comprehensiveness is the number one factor in developing any valid analytical process.

The Lender's Viewpoint

Many lenders use a systematic approach to analyzing credit. Using a hypo-

thetical case farm, put yourself in the shoes of the lender to see how credit is analyzed. This hypothetical case focuses on a farmer who desires to add an enterprise that will require additional capital. The farmer has provided a balance sheet along with past and projected annual cash-flow. The agricultural guidelines and yardsticks discussed below are based on university research and experience with agricultural credit analysis.

Repayment Capacity and Analysis.

An annual earnings summary can be a useful tool for uncovering repayment problems by calculating key earnings ratios (table 1). This earnings chart can be used to analyze past as well as future earnings. Often a 3-year history is used to provide a means for a trend analysis. The procedure is the same for a large commercial agricultural loan or a small part-time farm credit request and is compatible with farm computer accounting systems.

Preparing an Annual Earnings Summary. Use this step-by-step procedure to figure earnings, as illustrated in table 1. This format provides a process to arrive at the earnings available for risk and uncertainty (\$16,350 past and \$26,972 projected) and a means to calculate key earnings ratios.

Step 1. Add all revenue from sales and adjust for inventory changes relating to revenue. For example, in the case example it would be \$198,500 past, \$375,000 future.

Step 2. Add any gross nonfarm revenue. Gross nonfarm revenue was \$23,000 past, \$25,000 future.

Step 3. Subtract all farm operating expenses and adjust any inventory changes and accounts payable relating to farm expenses, and exclude interest and depreciation (\$139,500 past, \$271,000 future).

Step 4. Subtract family living expenses and State and Federal income

Table 1. Hypothetical Case: Farm and Family Earnings Worksheet

		Past	Projected
1.	Total business revenue	\$198,500	\$375,000
2.	Plus: nonfarm revenue	+23,000	+25,000
	Subtotal	221,500	400,000
3.	Less: business operating expenses (excluding interest paid + depreciation)	-139,500	-271,000
	Earnings available for family living and interest, principal payments, and new investments		
	Subtotal	82,000	129,000
4.	Less: family living expense, income taxes	-36,000	-40,000
5.	Earnings available for interest and principal payments and new investments		
	Subtotal	46,000	89,000
6.	Less: interest and principal payments and interest on operating capital	-29,650	-62,028
7.	Earnings available for new investments, risk and uncertainty		
	Subtotal	16,350	26,972
8.	Earnings coverage ratio = line 7 ÷ line 6	55%	43%
9.	Debt payment ratio = line 6 ÷ summation lines 1 & 2	13%	16%
10.	Operating expense - revenue ratio = line 3 (excluding interest + depreciation) ÷ line 1	70%	72%

taxes. For the family represented in the case example, it would be \$36,000 past, \$40,000 future.

Step 5. Subtract all interest and principal payments, including operating and seasonal loan interest. This figure is \$29,650 in the past and \$62,028 in the future.

Earnings-Coverage Ratio. The earnings-coverage ratio is a measure used to assess the farmer's ability to repay, as well as the repayment risk (table 1, line 8). It is calculated by dividing earnings available for new investment, risk, and uncertainty by total annual debt payment. In the example (table 1), it would be 55 percent in the past (\$16,350/\$29,650) and 43 percent projected (\$26,972/\$62,028). A strong ratio would be 30 percent or above while an acceptable but riskier percentage would be 10 to 30 percent. A minimum acceptable

ratio would be 10 percent in today's risk-laden farm economy. If this ratio is declining, or is negative for multiple years, it is an indication of financial problems.

Debt-Payment Ratio. The debt-payment ratio is a factor used to determine the risk over the term of the loan. It is calculated by dividing total annual debt payments by total revenue. In the illustration (table 1, line 9), it would be 13 percent in the past (\$29,650/\$221,500) and 16 percent projected (\$62,028/\$400,000). This indicates that \$.13 and \$.16, respectively, of every dollar's worth of revenue generated is being used for debt payment. As a general strategy, total payments (principal and interest) for a given year should not exceed 25 percent of revenue. A ratio of less than 15 percent would be relatively safe, while a 15-25 percent range would indicate some degree of risk. If a farmer is expanding the

operation or in circumstances of considerable uncertainty (starting a new business enterprise, for example), this ratio should not exceed 20 percent.

Business Operating Efficiency. The operating expense-revenue ratio is a means to ascertain the operating efficiency of the farm business exclusive of debt commitment. The degree of operating efficiency of a farm business can influence the level of annual debt payment, amount available for new investment and risk, general standard of living by the farm family, and the need for off-farm earnings to supplement the farm business. As illustrated, the farmer had a 70-percent historical ratio and 72-percent projected figure, or \$.30 and \$.28, respectively, remaining for debt service, family living and taxes, and risk and uncertainty.

Commercial farms with this ratio at less than 70 percent usually have very efficient managers who can handle larger amounts of debt. If this ratio exceeds 80 percent, it is a signal that repayment problems could occur if large amounts of debt are outstanding. If smaller, part-time farmers are prevalent in your market area and portfolio, this ratio will generally be higher, but it is important to keep this ratio as low as possible to reduce the draw of off-farm revenue. If an analysis is being completed on historical trends or future projections, it is

important to investigate any deviations in ratio percentages to determine causes.

Financial Position. The balance sheet provides information for testing the liquidity and solvency of the farm financial statement. This is another important component of the loan analysis process.

Current Ratio. The current ratio, which compares current assets to current liabilities, is an important measure of the liquidity of a farm business. The farmer in table 2 has a current ratio of 1.23:1 (\$78,500 current assets and \$63,080 current liabilities). A realistic appraisal of most farm balance sheets would find 1.5 to 1 ratio relatively strong. A ratio below 1 to 1 is a sign of possible short-term financial problems, if they have not already occurred.

Percentage Equity. A mechanism to measure the solvency or the overall financial position of the business is the percentage equity found by dividing net worth by total assets. Also, the leverage ratio (total liabilities/net worth) and the debt-to-asset ratio is sometimes used by lenders. In the example in table 2, total assets of \$943,000 minus \$378,080 of total debt or \$564,920 net worth would equate to a 60 percent equity. The higher the ratio the greater the degree of security to the lender.

These ratios obviously are dependent upon the values placed on the assets. Therefore, it is difficult to make a gen-

Table 2. Projected Balance Sheet Summary

Current assets	\$ 78,500	Current liabilities	\$ 63,080
Intermediate assets	264,500	Intermediate liabilities	105,000
Long-term assets	600,000	Long-term liabilities	210,000
Total assets	\$943,000	Total liabilities	378,080
		Net worth	\$564,920
		Total liabilities & net worth	\$943,000

eral statement about relative risk until the method used to value assets is considered. During the farm debt crisis of the early 1980's, it was commonly felt that less than 40 percent equity represented extreme risk. Likewise, ratios above 70 percent were considered relatively strong.

As real estate market values declined, the percentage equity ratios also declined. In the Midwest, for example, where land may have lost half of its value in the 1980's, the percentage equity may show a decline when the farm financial picture is actually stronger and more stable. Again, this demonstrates the importance of consistent valuation of assets. Generally, however, if conservative asset values are used, an equity ratio exceeding 75 percent would be an indication of a low-risk, financially sound operation. Equity ratios less than 40 percent indicate a need for more careful debt and cash-flow analysis.

Lenders will be interested in the percentage equity since this represents the owner's investment that is at risk. It is the borrower's obligation to provide the first risk capital to the operation—to "capitalize" the farm. The owner's personal investment is assurance to the lender whose funds are protected by the owner's investment.

Collateral Position. The balance sheet can provide insight into reserves and excesses in equity that could be drawn upon or used as borrowing power in the event of inadequate earnings, additional credit needs, or decline in the value of assets.

Guidelines concerning collateral position vary depending on the source of credit and the types of assets for which credit is requested. Most agricultural lenders are reluctant to lend over 65 percent of the land and buildings, 60 percent of the machinery and livestock, and 80 percent on current assets. Lenders, however, will be reluctant to finance

an operation that has reached these theoretical limits in each category. Rather, the knowledgeable lender will evaluate cash-flow and repayment capacity first and will depend on the collateral position only as a backup. That is, borrowing capacity should be based on repayment capacity first and collateral position second.

Credit Management. Once the acquisition and allocation of the assets of the operation are determined and the appropriate debt and repayment structure is in place, constant monitoring and management of credit is essential. Debt structure and repayment terms, tracking of security, and marketing progress of repayment are frequent problems if numerous creditors are involved. Numerous creditors often hinder a solution if and when problems arise.

Sound credit analysis may include periodic review of open accounts with merchants, dealers, and suppliers. A check on personal credit card balances can be useful to analyze personal accounts. A strong sign of cash-flow and credit management is when accounts payable, after initial billing, average less than 5 percent of revenue. If unpaid bills average more than 10 percent of revenue, it is a sign of pending credit problems. Any sharp increase in accounts payable or a general trend upward will be carefully scrutinized.

Production Management and Profitability. Production management of a farm operation can have a direct link to revenues and profits. Since production rates and efficiency can vary for a given area and enterprise, a general analysis is used to assess management relating to production—for example, top 20 percentile, 20-50 percentile, or below average. Lenders may want to size up the management skills of a loan applicant in areas such as production efficiency, cost control, and profitability, and thus may

require an analysis for more than 1 year to ascertain trends.

Comparisons of production factors and financial ratios are revealing and benefit both borrower and lender. Comparison data may be available from the land-grant university in your area, your State Extension Service, farm organizations, or other groups offering farm records and analysis.

Farm businesses that are considered to be very profitable would have a return greater than comparable investments such as savings and other nonfarm investments. The farmer in our example (table 3) had past and projected returns that are positive but less than comparable investments. Return on investment averaged 5 percent while return on equity averaged 2 percent. Historically, income returns on farm investments have been relatively low—averaging in the 3-4 percent range. Return on equity has been even lower. A commercial farm can survive in the short run with small or negative returns, but both lender and farmer must carefully scrutinize the business if this scenario continues over the long run.

Individual and Farm Resources.

Evaluating the financial situation and management of an agricultural business frequently involves more than analysis of the basic financial statements.

Personal Characteristics and Habits.

A lender will look at the health and age of the individual requesting credit, as well as that of the entire family. The stability of family relationships and evidence of estate planning or transfer of farm assets and short- and long-term goal setting are prime considerations. Education and practical experience should be observed, as well as how management techniques are applied to the farm operation.

Onsite Visit. A good credit analysis will include onsite investigation of the overall resources—land, buildings, im-

provements, livestock, and machinery—and personal living habits. These formal inspections can be used to monitor inventory and possibly do appraisals of real estate, livestock, and machinery, as well as a check of security and collateral. The quantity and quality of land, including explanation of leases, land contracts, and other pending situations, will be examined. Onfarm visits should include general observation of the amount and condition of livestock, feed inventories, machinery, and buildings. Available storage and state of repair of machinery often can be a clue to future needs which could be classified under business development.

Lenders will critically evaluate the effects that economic and market trends have on the farm business. Forecasts, outlook, and other projections of costs and expenses related to various farm enterprises can help determine the overall health of the farm business and the customer's needs, desires, and strategies for success.

Table 3. Projected Profitability Calculations

			Projected
Net farm income			
Total farm revenue			\$375,000
Total farm expense (includes interest and depreciation)			331,000
Net farm income			44,000
Return on assets			
Net farm income			44,000
Plus: interest paid			40,750
	Subtotal		84,750
* Minus: operators' labor & management			15,000
** Minus: 5% management fee			18,750
	Subtotal		51,000
	Subtotal	51,000	
Total farm assets		943,000	= 5.4 %
Return on equity			
Net farm income			44,000
Minus: operators' labor & management			15,000
Minus: 5% management fee			18,750
	Subtotal		10,250
	Subtotal	10,250	
Total farm net worth		\$564,920	= 1.8 %

*The management fee includes \$7,500 per operator plus 5 percent of gross farm earnings. This value is a composite of various figures used by professional recordkeeping systems in agriculture. It includes unpaid family and operator labor.

**Some agricultural financial analysts frequently substitute family living drawn as a management fee. However, wide variations can occur depending on size of family, location, and lifestyle.

Managing Human Resources on the Farm

Effective human resource management begins with planning. Successful implementation of a plan requires that personnel be recruited and then managed effectively. Managing personnel involves the major functions of work scheduling, training, motivation, evaluation, and discipline

Personnel Planning

Effective personnel planning starts with a self-assessment by personnel managers. Their personal characteristics, attitudes, strengths and weaknesses, and supervisory skills directly affect the working relationships among employees and others in the farm business.

Personnel needs depend on the work (tasks) to be done, the types of products grown, and the machinery and technology of each farm. An analysis of personnel needs should result in a statement of the kind and amount of work to be done, which, in turn, provides a basis for determining the number and types of workers needed.

Matching current personnel—family and nonfamily—with tentative job descriptions is a critical step in developing job descriptions for new employees. Identifying mismatches between job descriptions and current responsibilities may help point up training needs, adjustments in job descriptions, shifts in responsibilities, and, most important, tasks that cannot be adequately handled with existing personnel.

Hiring Employees

A personnel plan provides the basis for hiring, which includes recruitment of potential employees, interviewing applicants, and choosing which employees to hire.

No one—family members included—should be hired without an interview. The interview provides an opportunity to compare applicants, give applicants information about the job, and get opinions from family members and current employees about which applicant to choose.

Bernard L. Erven, Farm Management Extension Specialist, Ohio State University, Columbus, OH, and
Kenneth H. Thomas, Extension Economist in Farm Management, University of Minnesota, St. Paul, MN

The person you hire should be the person who best fits the job description. Farm managers are often tempted to hire the “best” person, the most experienced worker, the one most likely to stay many years, the one willing to work for the lowest wage, or the one likely to have the fewest questions. However, such an approach can negate the good planning and hiring work that the manager has done up to this point.

Managing Personnel

For a team of family and hired workers to function efficiently and effectively, one or more supervisors must carry out the following five personnel management functions: work scheduling, training, motivation, evaluation, and discipline.

We will illustrate the importance of each function with a hypothetical problem situation and discuss the key principles that underlie each function.

Work Scheduling. *Kirk supervises his brother and two other employees who spend 90 percent of their time feeding and caring for cattle at four different farms. Kirk believes that varying an employee's work helps maintain job interest. Kirk and the employees report for work at 7 a.m. Each day begins with Kirk providing instructions for what each person is to do that day and at which farm the work is to be done. By 7:30 a.m., all employees have moved to their assigned farms and are at work. If they run out of work during the day, they seek out Kirk for instructions on what to do next. Employees wonder why they don't go directly to the farm where they will be working and start work immediately rather than wasting the 30 minutes getting their daily instructions from Kirk.*

Work planning and scheduling increase labor efficiency. Waiting for in-

structions, searching for a supervisor, duplicating the work of another employee, waiting for equipment to be available, doing maintenance work during critical periods of the production season, and wasting planting and harvesting time because equipment was not ready for the season are examples of inefficiencies caused by poor work scheduling. In the above scenario, employees are wasting time waiting for daily instructions, and, in all likelihood, wasting time searching for Kirk when they run out of work.

Work scheduling should be based on a list of tasks to be accomplished, the machinery and equipment needed for the tasks, the people available to do the tasks, and the time in which the work must be done. A task list identifies what needs to be done within the next period or periods of time. The work schedule accompanying the task list identifies the workers and equipment for the tasks. Providing instructions to workers about the tasks they are to do and when and where they are to do them is the final element of the work schedule. The instructions do not have to be given every day if employees are well trained and well supervised. Kirk might consider more advance planning and scheduling for his workers.

Training. *For 20 years, Jerry has employed part-time tractor drivers to help during planting and harvest seasons. He has always been able to hire retired farmers, and sons and daughters of neighboring farmers. In the past, Jerry has required extensive tractor driving experience of all new employees; but with the decreasing number of farms in his community and increasing nonfarm employment opportunities, Jerry has had difficulty finding experienced tractor drivers. Thus, he has started hiring people with little or no*

tractor driving experience. Recently, a new employee was seriously injured in a tractor accident.

Farm managers who hire workers with little farm work experience must provide extensive training to new employees. The complexity of many farm tasks, the risk of injury to untrained workers, and the labor inefficiencies that result from undirected, on-the-job stumbling make training essential. Jerry's employees operate equipment in potentially dangerous situations. They must have the proper training in order to reduce the risk of accidents.

Farmworkers have a fatality rate that is more than 50 percent higher than that of construction workers—and farm accidents often involve farm family children. The farm, with its complicated machinery, sophisticated equipment, and sometimes dangerous chemicals, is often inherently dangerous. Work is often done under severe time pressure by workers who are tired and under stress. Shortcuts such as removing protective devices, not replacing "Slow Moving Vehicle" signs, and speeding on the highway are often tempting. It is essential to incorporate safety guidelines into training programs and to regularly reinforce the guidelines.

Hiring experienced workers is sometimes considered an alternative to carefully planned and implemented training programs. In fact, all employees require training. Experienced employees may require considerable training to change poor work habits, inefficient practices, and lax attitudes toward safety that can endanger themselves and fellow workers. Some employers even prefer to hire inexperienced workers for some tasks—such as milking, farrowing, and pest scouting—because training can focus on the skills that are needed and not on retraining or changing old habits.

Motivation. Linda and her brother Tom own and operate an apple farm. The apples are sold at their farm market. Linda supervises two employees in the market—her 26-year-old son, who works full time, and a retired police officer, who works 20 hours per week. Their morale and attitude are critical to the success of the market because of their regular contact with customers. Linda has noted her son's decreasing interest in the market, which she believes is due in part to the fact that Tom encourages him to leave the market and help with production. And while Linda appreciates the retired police officer's positive attitude and cheerfulness, she wishes he would spend less time discussing basketball with the customers and more time discussing apples.

Employees—family members included—do not change their behavior simply because someone tells them to do so. In fact threats, bribery, and other



With all of the work to do around the farm, there is also a need to talk things over and work out problems. Missouri farmer Walter Bracht and son-in-law Joe Gaddy find the living room floor a good place to chat. (Photo by Michelle Bogle, 035-92-18)

types of manipulation may make little difference in an employee's work habits or attitude. The challenge for the farm manager is to balance workers' needs for job satisfaction with the farm's overall business goals.

To do this, the farm manager must identify employees' most important unsatisfied needs and then determine the feasibility of satisfying those needs through work itself or conditions at the workplace. For example, Linda's son may have lost interest in the market because there is no opportunity for advancement. Can an advancement opportunity be provided, or would a change of responsibilities be in the best interest of both the son and the farm?

A person working primarily to satisfy a need for social interaction may care little about labor productivity or sales. Can the person satisfy social needs at break times, before and after work, or through casual conversation during work? Or must the worker be disciplined for wasting time on the job? The retired police officer may enjoy socializing with customers so much that it jeopardizes his effectiveness as an employee. Linda must decide what steps, if any, are required to limit his socializing.

Evaluation. *Lynn employs 12 people who are divided into three work groups—milking, cow and calf care, and crop production. All of them help with maintenance. In the past, Lynn's strategy has been to give raises when employees ask for them or threaten to leave. Her informal assessment of her current employees is that four are outstanding, three are acceptable, and five are poor. However, these assessments have not been put in writing or communicated to the employees. During the past 14 months, the four outstanding*

employees have not asked for raises and Lynn has not offered them. Two other employees, neither of whom Lynn finds easy to talk to, keep asking for more money. They often point out how much less they are earning than most of the other employees, and both have threatened to leave. Lynn doesn't want them to go, but she doesn't think they deserve raises.

Lynn needs to establish a formal evaluation program that lets employees know where they stand on a regular basis and includes guidelines for wage increases. The evaluation should tell employees how they are doing, identify areas where improvement has occurred, and offer constructive suggestions for work improvement. Specific plans for training and job improvement should be discussed. Workers should also have the opportunity to make suggestions, raise questions, and air frustrations and complaints.

In addition to ongoing daily or other regular communications with workers, there should be at least one formal evaluation meeting with each employee every year that provides opportunities to review performance and progress during the past year and to establish performance goals for the coming year.

Compensation should be discussed during the evaluation meeting. Any changes in compensation should be consistent with the strengths and weaknesses discussed in the evaluation meeting. Merit increases should go only to those who have earned them, and employees should understand why they are or are not getting a raise.

Discipline. *Larry supervises 14 full-time employees in a vegetable packing shed. It is important that all workers report on time because the sorting and packaging lines cannot operate effi-*

ciently with people missing. Although Larry has not provided employees with a handbook, he has made it clear that work begins at 7 a.m. Last week, Bill, a mediocre employee whom Larry considers to be a troublemaker, came to work 25 minutes late. Although it was the first time Bill had been late in more than a year, Larry told Bill he had to learn to be on time and sent him home for a day without pay. A few days later, Andy, who Larry considers his best employee, came to work more than an hour late for the second time in 2 months. Larry asked Andy if he was still having trouble with his car but said no more about his being late.

Workers function best when the rules are clear and they know the consequences of breaking them. Discipline problems can be minimized through careful employee recruitment and training, clear communication of work rules, and proper attention to human needs. Nevertheless, when discipline is necessary, the supervisor should not sidestep the responsibility. Failure to provide discipline sends wrong and confusing messages to workers. Because Larry has treated Andy's tardiness so differently than he did Bill's, the other employees are likely to find the situation confusing and unfair. Does Larry really care whether workers come to work on time? Does the punishment for being late depend on who is tardy?

A few guidelines can improve a supervisor's ability to provide appropriate discipline: Discipline an employee's behavior or act; do not berate someone for a mistake; permit the employee to maintain self-respect; keep disciplinary actions consistent with the seriousness of the violation; be sure the employee understands the reason for the discipline; take action as soon as possible after the act instead of storing up a series of minor offenses in order to "come down hard" on the person; be consistent in discipline.

Machinery Management

Farm machinery and equipment are essential to the operation of most farm and ranch businesses. U.S. farm machinery and equipment are currently valued at nearly \$75 billion, ranking only behind farmland as the most valuable asset in U.S. agricultural operations.

Agriculture is one of only a few industries that uses such capital-intensive machinery for such short periods of time. It is not uncommon for farmers to own combines valued at \$60,000 or more, yet use them for only 12-15 hours per day for 10-20 days per year. Such large expenditures appear to be justified because of the potential for high losses from a late harvest.

In some countries, such as Argentina, land holdings are large and expensive capital assets are used round the clock during critical planting and harvesting seasons. This helps lower per acre costs and makes the farming operation more cost competitive.

Proper machinery management can improve the efficiency of farming operations and, thereby, increase the incomes of agricultural producers. When making machinery management decisions, the

farm manager needs to consider capacity, ownership and control, maintenance, and replacement.

Capacity

To determine a farm's optimal machinery capacity, the farm manager needs to know the acreage of each crop to be produced; the tillage, planting, and harvesting operations; costs of various types and sizes of machinery; labor costs; and the costs of untimely operations.

Determining optimal capacity is not an easy task. The decisionmaking process is complex. A number of decision-aid tools are available through the Cooperative Extension Service and private software vendors. In recent years, microcomputer programs for selecting farm machinery have been developed at a number of universities. These programs offer valuable assistance in determining optimal capacity.

Ownership and Control

A critical decision faced by the farm manager is how best to control the use of farm machinery and equipment. Control alternatives include purchase, joint

David A. Lins, Professor of Farm Financial Management,
Department of Agricultural Economics, University of Illinois,
Urbana, IL

ownership, financial lease, operating lease, and custom hire. Each alternative has advantages and disadvantages; no alternative is likely to be best for all situations. The astute manager needs to determine which alternative is best for his or her own operation.

Purchase. The most common method of acquiring farm machinery and equipment is to purchase it. The benefit of purchasing is that the owner has complete control over use of the equipment; however, the owner also has complete responsibility for the equipment's maintenance. Before purchasing, the farm manager should determine whether the farming operation can support the purchase with cash or borrowed funds. If so, the manager should seek the most satisfactory financing arrangement.

Joint Ownership. One method of reducing machinery and equipment costs is joint ownership. Joint ownership is most common among relatives or close acquaintances. A successful joint ownership is dependent on a clear and documented understanding of each owner's rights and responsibilities. The time the machinery is available to each party, who is responsible for maintenance and storage, and compensation agreements (if one party uses the machinery more than originally planned), should be determined and put in writing before the purchase is made.

Financial Lease. Another method of controlling the use of machinery is through a financial lease—a long-term contract in which the farmer has exclusive use of the machinery over a significant portion of its useful life. Financial leases were once motivated by tax considerations. However, tax incentives for financial leasing have been reduced. Financial leasing now appears to be attractive because of the implied fixed rate of interest as a part of the lease agreement (as opposed to a variable

interest rate loan for a purchase with borrowed funds) and because the upfront cash needed to lease may be less than the upfront cash needed to purchase. Financial lease contracts are commonly available on big-ticket items such as combines, tractors, and irrigation equipment.

Operating Lease. An operating lease is an arrangement whereby a producer can rent equipment on a short-term basis—hourly, weekly, or monthly. An advantage of an operating lease is that high-cost equipment needed for a short time period can be made available at a lower cost than ownership. A disadvantage is that equipment may not be available when needed. Transporting the equipment may also be inefficient and time-consuming.

Custom Hiring. Custom hiring can be a good choice when you need high-cost or specialized equipment for a short period. By offering services to many farmers, custom operators can spread the cost of machinery and equipment over many acres. For example, some custom combine operators start in Texas and follow the wheat harvest north to Canada. Custom hiring also can be attractive if labor is scarce. Farmers with excess machinery capacity may find it profitable to offer custom services to others who may lack adequate machinery capacity.

Which Option Is Best?

Three criteria can be used to determine which method of controlling machinery and equipment is best for a particular operation—cash-flow feasibility, capital debt repayment capacity, and net present value.

Cash-Flow Feasibility. Cash-flow feasibility tells a manager whether the farming operation is generating a sufficient amount of cash to meet the payments required by a given acquisition method. For example, it may be better

from a profit standpoint to purchase a combine rather than to lease it. But if the purchase requires a large cash down payment, it may not be feasible from a cash-flow perspective. The cash down payment may deplete operating capital or funds needed for other business decisions. A cash-flow projection can be used to help evaluate cash-flows under each acquisition method.

Capital Debt Repayment Capacity.

Capital debt repayment capacity measures the ability of the farm to generate enough profit (but not necessarily enough cash) to support machinery acquisition. Agricultural lenders have come to rely heavily on capital debt repayment capacity measures in evaluating loans for the purchase of machinery. Capital debt repayment capacity measures can help avoid costly problems which may arise in farming operations prone to purchasing machinery when "cash" is available but when profits in the business are lacking. Agricultural lenders or farm finance textbooks can provide additional information on how to measure capital debt repayment capacity.

Net Present Value. Net present value calculations provide a mechanism for a direct comparison of one acquisition method versus another. The net present value approach is simply one of taking all cash inflows and all cash outflows associated with an investment and discounting them back to the present. While useful in sorting out the best alternative, this approach often overlooks the issues of cash flow feasibility and capital debt repayment capacity. Most farm management and agricultural finance textbooks cover the mechanics of doing net present value calculations.

Taxes and Machinery Management

Tax considerations often influence farmers' machinery investment deci-



This prototype kenaf harvester, specially designed to cut whole kenaf stalks into 12-foot lengths and place them in windrows, was built mainly from combine parts readily available from local farm equipment dealers. (USDA Photo by Ron Nichols, 88BW1890-8)

sions—sometimes more than they should. Consider the case of Joe, a large dairy farmer who did not like the idea of owing income taxes at the end of the year. Joe made a practice of carefully estimating tax liabilities several weeks before the end of each year. If it appeared that taxes would be due, Joe would buy enough machinery to generate sufficient investment tax credit to offset any tax liabilities. While Joe never paid year-end income taxes and had a large fleet of relatively new machinery and equipment, he also had a correspondingly large amount of debt. Joe went bankrupt. While tax considerations do affect machinery investment decisions, they should not overshadow common sense.

The 1986 Tax Reform Act made numerous changes to the tax code that were designed to reduce tax incentives for investments in agricultural assets. It appears that those changes have been successful. However, farmers and ranchers still have a variety of tax incentive

options—including three different depreciation methods and a choice between expensing and not expensing the first \$10,000 of machinery investments each year. In most circumstances, the depreciation and expensing options that allow for the most rapid charge-off are preferred.

Machinery Maintenance

Strategies for reducing repair and maintenance costs are an important component of many successful farming operations. Keeping machinery in top working order often involves a tradeoff between time and labor costs and the potential losses resulting from untimely breakdowns. Many farmers have become excellent mechanics, doing most of their own repairs and maintenance. The alternative is to rely on dealers or trained mechanics to handle the necessary repairs and maintenance.

In determining the value of doing his or her own repairs, the manager should consider several factors. First, proper repairs may require the purchase of special tools and equipment. Second, repairs require time; therefore, consider what the manager or employee could be doing instead of spending time on repairs. Some farmers have increased profits by handling only basic maintenance while relying on dealers or trained mechanics to provide major repairs and overhauls.

Creative strategies to address specific repair and maintenance needs should not be overlooked. For example, Tom is a large-scale grain producer who found that it pays to shop around for parts. Each winter, he lists all the parts he expects to need during the coming year. He then takes this list to 4-6 dealers for bids on the entire list of parts. He offers to pay cash up front for the parts and gets them during the nonpeak season. Tom estimates savings of at least 20 percent over

buying the parts on an individual as-needed basis. Granted, he ends up with some parts that are not needed in the next year; but with careful planning, he has avoided stockpiling unnecessary parts for any extended period.

Other farmers have found great success in buying used equipment as a source of spare parts. This strategy can be particularly useful if the manager has good mechanical skills and can make major repairs on older equipment.

Replacement

When to replace machinery and equipment is another important machinery management decision. Too often, the decision to replace is made on the basis of the amount of cash available for such investments. Periods of high incomes in agriculture are typically associated with periods of growth in machinery purchases. While adequacy of cash is an important factor, other factors should also be considered.

Production practices in agriculture continually change. In recent years, there has been significant movement toward reduced till and no-till farming practices. Some farmers have resisted this change because existing equipment “is still running just fine.” However, the decision to replace machinery should take into consideration the fact that some machinery and equipment may become obsolete before it wears out. Replacing machinery and equipment to take advantage of new technologies may offset the loss associated with selling outdated equipment. Most computers are replaced because of obsolescence—computer technology has been a rapidly changing industry—not because the computers are worn out. The same concept applies to farm machinery.

Used machinery can be an attractive alternative for replacement. Costs of used machinery tend to mirror the financial

health of the farm economy: When farm incomes are good, used machinery may be expensive; when farm incomes are depressed, used machinery is often inexpensive. Adopting a countercyclical purchasing strategy has helped some farmers keep machinery costs down.

When making machinery replacement decisions, maintain a balance between the various types of machinery being replaced. In some farming areas, it is common for most farmers to have the latest in 4-wheel-drive pickup trucks, while the old tractor is held together with baling wire. In other farming areas, it is not uncommon to see the latest and most powerful tractors towing hay wagons that are so inadequate that only half a normal load can be hauled. Certain types

of machinery and equipment are also status symbols. Maintaining a balance between the desire for status and the desire for maximizing farm profits is a key ingredient in machinery management decisions.

Machinery management requires a delicate balance among capacity, ownership, maintenance, and replacement decisions. Decisions must be made while weighing all these factors against each individual farmer's requirements and economic situation.

Investing in Dairy Livestock Facilities

The farmstead—including the buildings that comprise the dairy housing and milking center, machinery storage and repair shop, feed storage and feed mixing room, manure storage, and in most situations the farm home—is an important part of the total farm organization.

When investing scarce capital resources, determining the size and type of livestock facilities to build is one of the most important decisions faced by farmers who have livestock enterprises as a significant part of their farm businesses. Buildings have an important impact on livestock performance and worker efficiency. Farm buildings have long, useful lives of 15-50 years or more. Most building investments, therefore, have a certain degree of permanence; to be economical, they must be used for their entire lives.

Unique Problems

Livestock facilities—buildings that house milking, feeding, and manure handling equipment—are critical to efficient dairy farm operation. Investing in farm buildings presents unique problems. First, buildings are difficult, if not

impossible, to sell separately once they are constructed. Buildings are a part of a total production system and are, in most situations, too costly to move to a new location. Second, construction of new buildings often results in lost capital. (Lost capital is the difference between the amount paid for the building and the amount the building adds to the value of the farm.) In most situations, a building will add less than half of its cost to the total value of the farm.

Planning Farm Layout

Before constructing farm buildings, the farm manager must consider site selection and building design. The site must have adequate drainage, available water, and suitable topography for construction. The buildings must be oriented properly in regard to prevailing winds and sunlight. The building design should be flexible yet durable. However, buildings that are flexible but not specifically suited to the intended use often lead to serious labor inefficiencies.

The total farm layout must also be considered when selecting a farm build-

Wayne A. Knoblauch, Associate Professor, Department of Agricultural Economics, Cornell University, Ithaca, NY

ing's location. The locations should create efficient pedestrian, machinery, and livestock traffic patterns. The layout should be such that future expansions or additions are practical as well as possible. The buildings also should allow easy access from the highway to accommodate milk pickups, feed deliveries, and livestock transportation. Above all, the plan should be drawn to scale. Pedestrian, machinery, and cattle traffic patterns should be included on the plan drawings and then evaluated to determine if the buildings' sites could be rearranged to reduce travel distances and times without sacrificing site suitability.

Build or Remodel?

Remodeling existing buildings can be less costly than constructing new buildings and thereby reduce overhead costs and debt commitments. These factors can be important for farmers with limited capital resources or for farmers who are not prepared to make a long-term commitment to the industry. However, building from scratch has its advantages; these advantages may outweigh the cost advantages of remodeling. A new building can:

- Improve labor efficiency and, thereby, reduce labor costs,
- Improve animal performance with adequate ventilation and feed bunk space,
- Reduce energy and repair costs,
- Accommodate site selection of the building,
- Avoid complexities and difficulties often encountered when remodeling, and
- Improve appearance of the farmstead.

Contractor or Farm Labor?

When deciding whether to hire a contractor or use farm labor to remodel or

construct farm buildings, a good manager carefully examines the pros and cons of each alternative. Even if a farmer has the necessary masonry, carpentry, and electrical skills (as well as available time) to construct new buildings and can thus reduce the cost of building in comparison to hiring a contractor, the time required to build may detract from the management of the existing farm operation and thus cancel out any cost savings. The farm manager should compare contract construction costs with farm labor costs—considering the potential value of production foregone or costs increased on the farm. Also compare construction time—will farm labor take longer to complete the construction than a contractor?

Build Slowly or Rapidly?

Farmers often choose to add buildings or complete buildings gradually as herd expansion demands. Adding buildings on an as-needed basis allows the manager to test new technologies or building designs before making a total commitment. However, if the costs in any year are greater than the projected income, gradual expansion is not a good plan. Projections for gradual expansion should be compared with having a complete facility at capacity earlier. From a management perspective, it may be wiser to make a complete change at once rather than to be changing some aspect of the business each year for a number of years.

How Much Mechanization?

Capital investments in such equipment as mechanical feeders and automated manure handling and storage equipment can reduce labor requirements or make manual labor tasks less strenuous. However, many dairy farmers have found that the lower capital investment requirements of feed stor-

age and feeding equipment, such as bunker silos and mixer wagons, offset increased labor requirements. When evaluating the amount and type of mechanization to include in dairy buildings, the farm manager should analyze whether the higher annual costs of a more mechanized system will lower labor costs or sufficiently increase production to justify the purchase.

Economic Feasibility

Once a building plan has been developed, the farm manager must evaluate the economic feasibility of the plan. For construction of buildings to be economically justifiable, the buildings must add more to the value of farm production than they cost to own and maintain.

Buildings may add to the value of a farm's output by:

- Allowing a greater total product from a given set of inputs,
- Maintaining or preserving the quality of farm products, or
- Permitting the storage of commodities so they can be marketed at the most favorable times or used when needed.

Buildings may reduce production costs by:

- Reducing the amount of labor required to produce a commodity and perhaps adding to the comfort and productivity of the workers,
- Increasing machinery life and efficiency and thus lowering machinery costs, or
- Permitting more efficient use of machinery resulting from improved placement.

To determine if a new building can be justified economically, the partial budgeting technique can be helpful. A partial budget examines only those annual cost and return items that will be affected as a result of the change. The partial budget is constructed by identifying those items that will add to net

farm income and those items that will reduce net farm income. Items that will add to net farm income are those that will result in added annual returns or reduced annual costs. Items that will reduce net farm income are those that will reduce annual returns or add to annual costs. For more complex decisions where the entire farm organization will change, whole farm budgeting is a useful tool. (See Part III, Chapter 6 on partial budgeting and Part III, Chapter 7 on whole farm budgeting.)

To Expand or Not To Expand

Dan Dairyman must analyze whether to expand his dairy herd. The partial budgeting form provides a general format of the partial budget and is completed to show Dan's analysis. To accomplish the expansion, the free-stall barn must be enlarged at an estimated cost of \$50,000 and a new bunker silo constructed at an estimated cost of \$27,000. Fifty cows costing \$1,000 each and 20 yearlings costing \$500 each also will be purchased. Dan estimates that the existing milking facilities are adequate, but they will be used more hours each day. A larger milk tank is not needed because milk pickup will increase to a daily schedule to accommodate the extra production. Excess forage is currently grown and sold as a cash crop. This excess forage will now be used for the additional animals. All concentrate feeds will continue to be purchased.

Items that add to net income include the projected added annual returns from the sale of milk for 50 additional cows producing 18,000 pounds of milk at \$12 per cwt or \$108,000. Because there would be no reduced annual costs, the total added returns and reduced costs is \$108,000.

Items that reduce net income are \$27,000 in forage sales lost by feeding

Partial Budget Analysis of Dan Dairyman Adding 50 Cows

Assumptions

1. Barn addition will cost \$50,000
2. Bunk silo will cost \$27,000
3. Sufficient forage can be raised on farm for additional cows
4. All concentrate will be purchased
5. Purchase 50 cows for \$1,000 each and 20 yearlings at \$500 each

Items that add to net income

Items that reduce net income

Added annual returns:

50 cows 18,000 lb. of
milk sold per cow \$12
per cwt milk price

\$108,000

Total \$108,000

Reduced annual returns:

Forage currently sold \$27,000

Total \$27,000

Reduced annual costs:

Added annual costs:

Variable costs \$1,200
per cow 60,000

Fixed costs:

Building 3,760

Bunker silo 2,030

Cows and yearlings 1,650

Total 67,440

**Total added returns
and reduced costs (A)** \$108,000

**Total reduced returns
and added costs (B)** \$94,440

A minus B equals change in net farm income: \$13,560

additional animals and extra variable costs for such items as purchased feed, labor, veterinary and medicine, breeding, and building repairs—estimated at \$1,200 per cow for a total of \$60,000.

Fixed costs of owning the barn addition and new bunker silo are \$3,760 and \$2,030, respectively. Interest charges and insurance costs on the livestock are \$1,650. Fixed costs are depreciation, interest on average investment, and insurance. If property taxes would increase as a result of the addition, they should be included as well. In New York, new agricultural build-

ings are exempt from property taxes for 10 years. Thus, items that reduce net income total \$94,440.

The change in net farm income from adding cows is +\$13,560 (\$108,000 minus \$94,440). Dan should reevaluate the assumptions used in the partial budget and also perform sensitivity analysis to determine the impact of different milk production rates per cow, milk prices, and variable cost assumptions. If the addition of cows is consistent with the goals of the farmer and the family and provides the best use of capital—and if the debt capital required

and the repayment schedule are feasible—then Dan should make the change.

Building for the Future

Buildings are an important part of the farm organization. Planning the layout and design is critical and should be done before starting to build. By making a decision to invest in buildings, the dairy farmer is stating that projected returns from the use of buildings are greater than the cost of the buildings. Partial budgeting is one way to evaluate investment decisions.

Managing the Manager: The Professional Farm Manager

Farm managers must be experts in production, disease and insect control, financial planning, marketing, and a host of other areas. Yet even if a person has the ability and knowledge to be a farm manager, he or she may not have the time to manage. "Managing the manager" is a critical task. Some landowners choose to hire a professional farm manager to manage the farm. Professional farm managers can provide a wide range of farm planning and managerial services. (See Part VII, Chapter 2 for more information on professional farm managers.)

The Scenario

Jon J. Jones farms 700 acres in the cornbelt. Of this, he owns 160 acres purchased from his father and mother. He rents an additional 300 acres from his aunts and uncles and 240 acres from George Smith. George inherited his place from his father, who had employed Ray Albert, an Accredited Farm

Manager (AFM) of Central Farm Management, Inc., to manage the farm.

George Smith is now confined to a local nursing home, where the monthly charges are nearly \$2,000 per month. After his Social Security pension, George needs \$1,400 per month to meet his expenses without dipping into his limited savings. Ray Albert is aware of George's needs. To ensure these needs are met, Ray began planning with a basic plan that he refined into a strategic plan, from which he developed an accompanying working plan.

The Basic Plan

Ray's basic management plan for the Smith farm included an inventory of the resources of the farm, plus short-, intermediate-, and long-range plans for managing the farm.

Ray's inventory showed 240 acres of level, highly productive land without buildings or grain storage. However, the nearby co-op elevator had grain stor-

Eldon Greenwood, Vice President, Illinois National Bank of Springfield, Springfield, IL, and J. R. Hutchinson, President, Hutchinson Farm Management, Inc., Geneseo, IL
Both authors are past presidents of the American Society of Farm Managers and Rural Appraisers.

age and drying facilities at a reasonable cost.

Ray's plan suggested a method of leasing the farm to a neighbor, Jon Jones, who was starting to farm in partnership with his father. Ray's selection of Jon as a prospective tenant involved considerable time and research. When he interviewed Jon, he found that Jon not only had good practical farming knowledge, but also had excellent technical knowledge. Jon had kept the family's farm record books before going into military service. Along with keeping the record books, he and his father had gone over them many times to analyze their farm business. Jon had some savings, a good credit reputation, and the financial backing of his father. Ray reviewed Jon's history with George, who readily accepted Jon Jones as the new farm tenant.

A 50-50 crop share lease was recommended by Ray and accepted by Jon and George. The farm produces corn and soybeans. Generally, there is compliance with the USDA feedgrain program, with Jon sharing equally in the proceeds. Jon supplies the machinery and labor; George provides the land and pays the taxes. Jon and George share the other crop inputs equally and share the crop equally.

The Strategic Plan

Ray communicates frequently with his clients. When George entered the nursing home, Ray visited George and his family to determine the extent of financial needs which would have to be met by income from the farm. Ray knew he would have to plan for the farm to produce a minimum annual net income of \$16,800. George wanted the farm kept in a high state of fertility since he hoped his two grandchildren would inherit and keep the family farm.

Ray made a farm planning visit each year in August. During the visit, he and Jon would discuss the prospective feedgrain program, weed and insect problems, fertility needs, crop varieties, crop rotation, and tillage. This gave Jon plenty of time to arrange for fall fertilizer application to take advantage of favorable weather as harvest was completed. As amended from time to time, this plan was the basis for ordering seed and other inputs early to insure varieties desired and secure early pay discounts. Jon appreciated having this information as soon as possible, and he liked to know exactly what Ray expected of him.

In order to make the planning session go as quickly and smoothly as possible, Jon kept a planning file for the Smith farm. This file contained the current year's farm plan, most recent soil test results, Agricultural Stabilization and Conservation Service information on crop bases and established yields, seed and fertilizer availability, and expected prices.

Ray also keeps a similar planning file, which contains the basic farm plan as amended over time, copies of recent soil tests, the current year crop plan, and his notes on crop progress and problems during the year. Since there was an anticipated change in the feedgrain program for the upcoming year, Ray had made computer runs of several scenarios showing the net income effect of compliance or noncompliance with the feedgrain program using different crop yields and prices.

As Jon and Ray sat around Jon's breakfast table, each with his planning file, blank farm plat, and calculator, they discussed the current crop season and problems. Ray shared with Jon his computer analysis of the expected feedgrain program provisions. From their calcu-

lations and discussions, a new plan for the upcoming year evolved. Both made notes on their blank plat.

Fertilizer needs were discussed based on soil tests and anticipated plant food removal. Weed problems were discussed, and a preliminary weed control plan was developed. Insects had not been a problem, so use of insecticides was not planned. The condition of each crop variety was reviewed. Recent variety yield information was also reviewed. A preliminary decision on crop varieties was made pending final review and selection after harvest. Planting dates were discussed and decided upon; a plan for tillage also was developed.

Because Ray kept a planning file and analyzed his farm business records, he provided valuable input to the formal farm planning sessions. Through these sessions, which involved an exchange of information, Jon and Ray also developed good communications.

Ray prepared a typed, detailed version of the new crop plan. A copy was sent to Jon. Ray now had most of the information he needed to prepare a budget for George.

Ray reviewed the real estate taxes and timing of grain sales for George's farm. Next he reviewed his crop price outlook information and recent average crop yields for the farm. Now, Ray could develop the anticipated quarterly farm budget. George was very interested in this type of planning information. (See table.)

Making the Plan Work

In addition to planning, Ray inspects George's farm frequently and consults with Jon on the farm's needs. Ray pays the farm bills on behalf of George and reports the income and expenses to George quarterly. Farm progress reports are also made to George.

To develop a sound formal plan, informal planning must go on continuously. Jon and Ray are always collecting information for their planning files. Their ongoing planning helps them to efficiently develop an effective formal plan. Concise, well-written plans are typically carried out, while incomplete plans are frequently ignored and not properly executed.

It is easy to find time to plan if planning is on your mind and you know it must be done in a formal manner. Planning provides a road map for reaching your goals.

Cash-Flow Budget for George Smith Farm, by Central Farm Management, Inc.

Item	Jan - March 1989	April - June 1989	July - Sept 1989	Oct - Dec 1989	Total 1989	Jan - March 1990
Dollars						
Income:						
Corn	2,000 ('88 crop)	—	—	10,000 ('89 crop)	12,000	14,540
Beans	11,250 ('88 crop)	—	—	—	11,250	23,362
Feedgrain program	2,800 ('89 program)	—	—	500 ('88 crop)	3,300	—
Total Income	16,050	—	—	10,500	26,550	37,902
Expenses:						
Seed	2,086	—	—	—	2,086	2,100
Fertilizer	—	—	—	3,820	3,820	—
Herbicides	1,635	—	—	—	1,635	1,650
Crop insurance	—	745	—	—	745	—
Liability insurance	—	100	—	—	100	—
Real estate taxes	—	2,400	2,400	—	4,800	—
Management fee	1,203	—	—	788	1,991	2,653
Total Expenses	4,924	3,245	2,400	4,608	15,177	6,403
Net income	11,126	(3,245)	(2,400)	5,892	11,373	31,499
Beginning bank balance	500	7,426	(19)	(6,619)	—	(4,927)
Distributions	4,200	4,200	4,200	4,200	16,800	4,200
Ending bank balance	7,426	(19)	(6,619)	(4,927)	—	22,372

Because of the severe drought in 1988, there was limited crop to carry over for sale in 1989. Thus, there was insufficient cash-flow in calendar year 1989 to meet George Smith's distribution requirements.

Managing Assets On Small or Limited- Resource Farms

Managing a small farm enterprise requires a logical business plan to develop and allocate the farm assets. This plan must provide small operations with some flexible rule-of-thumb suggestions that apply sound economic principles of management.

Small farm operations have distinct characteristics that must be considered. Many small-farm operators exploring new technologies make the mistake of applying budgets and economic assumptions that are scaled down versions of those of big operations. These managers end up committing their scarce resources to doubtful ventures that ultimately fail. Rarely do small-scale operations that are losing money on an experimental venture have the working capital and the financial stability or cash flow to push the enterprise into the black.

Select New but Proven Ventures

One program that works specifically with small-scale farms and farmers is the University of Maryland Small-Scale Agricultural Research Program at the

University of Maryland Eastern Shore (UMES).

The program has devised five key management suggestions for small-scale farm operations:

- Commit at least, but not more than, 1 percent of total gross sales to research and evaluation of new products or services.
- Risk no more than 1 percent of total farm assets in the development of any new venture.
- Expand a product or service based on demonstrated profits, not expectations.
- Diversify to control your presence in the existing marketplace.
- Limit expansion to not more than a 20 percent increase in gross sales per year.

If managers commit 1 percent of their total gross sales toward research and evaluation of new enterprises, the resulting controlled approach to exploring new products and technologies can prevent impulsive investments in unproven economic ventures.

John W. Wysong, Professor of Agricultural and Resource Economics, University of Maryland at College Park, College Park, MD, and Thomas S. Handwerker, Assistant Professor, Small-Scale Agricultural Research, University of Maryland Eastern Shore, Princess Anne, MD

Market Strategies. Small-scale, limited-resource farms should base selection of new ventures, or diversification, on market strategy. It is important for farm operators to commit farm assets only to products or services that strengthen their existing marketing program. Small operations can obtain a market advantage by providing value-added products or services such as innovative pick-your-own operations, specialty fruits and vegetables, and organic and health foods.

These market strategies take advantage of niche markets by anticipating new trends and producing for expanding market demands. These products provide a market presence and prove a basic business principle—diversify to gain more control of the market.

Complementary Ventures. Productivity and efficiency are traditionally measured in terms of yields or production-per-animal, but small-scale farm operators must develop management programs based on the productivity and efficiency of the entire operation over many years. Complementary ventures, with reciprocal requirements—such as combining plant, animal, and fish production—can maximize the use of on-farm resources and minimize risk. Similar concepts are being examined under projects such as Low-Input Sustainable Agriculture (LISA), regenerative farming techniques (for example, at the Rodale Institute), and others. (See Part V, Chapters 3 and 4 on Low-Input Sustainable Agriculture.)

Innovative Technology. Small-scale operators are unable to purchase, acquire, or maintain assets competitively with larger agricultural operations. Yet, both in number and in economic return to the rural community, small farms have the opportunity to contribute to the local economy by researching new techniques and increasing community assets. The

development of innovative technology and products on an experimental scale can take advantage of opportunities available to small operations. But because of outside developmental pressures, small farm managers must assign farm assets to activities that strengthen or sustain the operation.

Unique Opportunities. When scarce resources are involved, costs and net return cannot be controlled by working in traditional enterprises such as field corn, wheat, soybeans, traditional livestock, and major fruits and vegetables. These volume products typically lack market adaptability and may provide only a marginal return. Recognize unique marketing opportunities that add value to agricultural products or services while using existing farm assets for more control over returns.

For example, a small farm manager with experience growing field corn can begin to diversify into seed corn, ornamental corn, colored corn, baby corn, or halloween shuck products. These products easily use existing assets, including the grower's experience, to explore and develop a market without risking more than 1 percent of the total farm assets. Introducing any new product or service requires time, product recognition, and promotion. These corn items use the principle set forth by UMES that growers should not commit over 1 percent of their total farm assets to a product until it begins to yield a profit.

In other examples, a farmer could easily switch a small dairy herd slowly from hormonal-additive feeds to organic feeds to satisfy a new market niche. Vegetable growers operating retail stands along major highways are constantly incorporating new varieties (colors, shapes, and sizes) to maintain customer interest. Many growers now produce pick-your-own chrysanthemums and other field crops as visual aids to stop traffic and

maintain a market presence. These diversified products neither become major production items nor significantly decrease costs; however, they provide a degree of stability in the marketplace. Costs can be minimized by maintaining a presence in one type of market and satisfying a demand.

Limit Growth

Management and ownership are often synonymous in small-scale agricultural operations being run by one or two members of a family. The decision affecting the allocation of farm assets is often made following sound management practices weighed by individual expectations and goals. Successful farm managers, or entrepreneurs, are continually testing and developing new product lines or services. However, diversification and expansion in any business leads to stress and requires more technical evaluation.

To counter these problems, the UMES program suggests that small farmers cap their annual growth rate at 20 percent in gross sales. This provides an opportunity for farm managers to evaluate the operation and to eliminate or curtail production if necessary. This simplifies the farm program and prevents burnout as the operation evolves. Restricting growth to a 20-percent increase in gross sales forces farmers to keep only those components that reap the highest profits. Other assets can then be idled, rotated, rejuvenated, or stored. The goal of any limited-resource farm manager is to make more while using less.

Proceed with Caution

Management problems on part-time and small-scale farms cannot be eliminated by good management practices alone. A sound business plan must be developed too. Small-scale farm managers must first recognize both their limitations and opportunities, then establish a plan that reflects their expectations, and apply good management techniques for maintenance and operation.

For more information about programs in your region that address the needs of small farm operations, contact the Office of Small-Scale Agriculture, USDA/CSRS/SPPS, 14th & Independence Avenue, SW, Washington, DC 20251-2200. (See Part VII, Chapter 6 on a regional approach to the management needs of small-scale farms.)

Making It Work

In 1986, my farming operation was falling short of making debt payments, and my family was making sacrifices that were becoming difficult to accept. I knew there had to be something better, either leaving farming or finding a better way to farm.

The County Extension Agent suggested that I meet with a farm management specialist working with the Tennessee MANAGE program. At our first meeting we reviewed the financial condition of my farm, developed budgets, and drafted a long-range farm plan, which showed that my income should be large enough to provide us with a good living.

Long-Range Plans

At the next session, we updated the long-range plan with some corrected information and made a multi-year cash-flow projection. It became obvious that the repayment schedule would have to be adjusted. I was ahead with one lender and behind with another. (See Part II, Chapter 1; Part III, Chapters 5-7, and Part IV, Chapter 3 for more information on planning and budgeting.)

I submitted the reports to my two major lenders, and as a result both lenders worked with me to restructure my loan payments. One lowered the interest on my assignments, and the other put me on principal only for 1 year.

Controlling Cash-Flow

In the years that have followed, I have run a cash-flow projection each year. This has allowed me to gain a loan guarantee through a bank and further reduce my assignment to one lender. Annual planning has given me more control over cash-flow, and I have made more progress in paying off my debts.

Our family has reduced some of the shortfalls in our finances, and we are now able to better enjoy our life and look forward to a brighter future in farming.

Based on an interview with a Tennessee farmer by Jim Looft, Area Farm Management Specialist, Agricultural Extension Service, University of Tennessee, Springfield, TN

Part V

The Environment:

Maintaining Environmental Quality

While Succeeding in Business

Farmers and the Environment

From this Nation's beginnings through the first half of this century, America's natural resource base—its land, forests, water, and minerals—was viewed as virtually unlimited. Federal natural resource policy was directed toward placing these natural resources at the disposal of willing and enterprising entrepreneurs. These risk takers responded by leading the development and growth of the United States' economy to a position of leading world economic power.

Agriculture is a major user of natural resources. Traditionally, American farmers have been seen as managers of nature, using natural resources to produce food and fiber for this Nation—as well as supplementing much of the rest of the world's food and fiber needs.

A strong agriculture historically has been viewed, both by farmers and the general public, as basic to a strong America. The emergence of modern agriculture, with its dependence on chemical fertilizers and pesticides, was considered a necessary part of the United States' and the world's economic development.

Although there have been serious concerns from time to time about soil erosion, and programs implemented to address this problem, these efforts have tended to be sporadic. Concerns over water and other natural resource conservation have generally been even more limited.

Rise of Environmental Concerns

While there is still strong public sentiment in support of agriculture, there is growing concern that modern agriculture's use of agricultural chemicals in conjunction with natural resources creates undesirable side effects. Losses of sediment and agricultural chemicals into the environment generally are viewed as inevitable consequences of modern agricultural production. While low concentrations of these chemicals are probably harmless, the public is concerned about the effects of higher concentrations. For certain chemicals that have been identified with diseases such as cancer, there is alarm about their very use in farming.

W. Fred Woods, Public Policy Specialist, Extension Service, USDA, Washington, DC

And, indeed, there are reasons for the public's concern:

- Ground water contamination by chemical fertilizers or agricultural pesticides has been confirmed in at least 40 States. Half of the United States' population and 97 percent of the rural communities in the United States obtain their domestic drinking water from ground water.

- Pesticides have been linked with cancer, birth defects, and other diseases. Studies indicate that (1) people living in areas where pesticides are used heavily have increased risk of dying from certain kinds of cancer, and (2) farmworkers are at greatest risk, due to direct and prolonged exposure.

- Pollution of surface water by "non-point" sources—such as contaminants from livestock operations and salinity from irrigated farmland—has been reported as moderate to severe in at least 36 States.

The Farmer's Perspective

Farmers, once seen as the saviors from many of the Nation's problems, are now viewed by many as part of a problem. In some respects, farmers are caught in the middle of an important public concern.

And the farmer has a unique perspective on these threats to the Nation's environment. On the one hand, farmers responded to strong public pressures in the mid-1970's by rapidly increasing production of food and fiber. Incentives created by agricultural technology, the agricultural research agenda, and Government agricultural policies have encouraged intensive production of crops that have high erosion potentials and high agricultural chemical needs. These incentives have encouraged maximum production through increased use of fertilizer and pesticides, while they have



Farmers and the general public have historically viewed a strong agriculture as basic to a strong America. (USDA Photo by Ron Nichols, 1087x1098-22)

discouraged diversification of farm operations that benefit wildlife and rely less on the use of chemicals.

On the other hand, farmers are concerned about the impacts of agricultural chemicals on the environment. Farmers share the concerns of fellow citizens for a clean and safe environment as well as a productive agricultural system; and farmers, as individuals, are concerned about possible harmful effects of agricultural chemicals to themselves and their families.

Iowa State University's 1988 Iowa Farm and Rural Life Survey revealed that farmers' concerns about agricultural chemicals in drinking water ranked just after their concerns about farm prices and the Federal budget deficit. In this annual survey, more than 80 percent of Iowa farmers ranked pesticides as a major concern; and 70 percent ranked farm prices and the deficit as a major concern. Seventy percent also ranked adverse health effects from exposure to farm chemicals as a major concern.

What Will We Do?

All Americans want a clean and safe environment. But evidence implicating agriculture as a major contributor to environmental problems is rapidly accumulating. In particular, public concern about pesticide and fertilizer contamination of drinking water sources has

already led to State and Federal environmental legislation in this area.

Environmental legislation will continue to affect agricultural practices, but most observers believe these rules will have relatively little effect on the total production of major crops, from a national perspective. However, the effects of environmental regulations may be extremely important for some individual farm operations or for specific farming areas.

Legislation/Regulation. Restrictions on the use and availability of pesticides under present and future legislation may change production systems for various crops or restrict farming to those farmers who have demonstrated competency in the use of agricultural chemicals or who certify that they follow prescribed "best management practices."

Ground water pollution from agricultural chemicals—including insecticides, nematicides, herbicides, and fertilizers—may also force major changes in the kinds of crops or production practices used in areas where soil types, in combination with irrigation or rainfall, produce rapid leaching of these chemicals.

Current Federal regulations deny Government program benefits to farmers who convert wetlands to farmland or who, having highly erodible cropland, fail to begin implementing an approved conservation plan by 1990 or fail to complete the plan by 1995. Local regulations limit certain farming operations in areas where urbanization is pressuring farmland.

Sustainable Agriculture. Many farmers are adopting alternative farming practices and systems that substitute higher levels of management and diversified farming practices for chemical inputs. Called "sustainable agriculture," these alternatives have three es-

sential long-term goals: (1) to allow productive and profitable farming, (2) to conserve natural resources and protect the environment, and (3) to ensure food safety and quality.

These and other farmers are discovering that many sustainable agricultural practices actually reduce cash costs (thereby increasing cash income) while reducing adverse environmental impacts. Farmers in one area of Nebraska voluntarily reduced applications of nitrogen fertilizers by 27 percent without any appreciable loss in crop yields. By also ceasing to make fall fertilizer applications, they further lowered ground water pollution. (Research in their area had found that 60 percent of fall-applied nitrogen leached into ground water.)

Agricultural Research. Special agricultural research programs have been targeted to identify agricultural production systems that meet sustainable agriculture goals. These research results will be made available to farmers as quickly as possible. Biotechnological research also promises longer term approaches to solving environmental problems. For instance, both public and private research is proceeding to develop corn and other nonleguminous plants that produce their own nitrogen, repel harmful insects (and even some competing weeds), and resist plant diseases. Such research, when available for use, will eliminate or greatly reduce the need for applications of nitrogen fertilizers and chemical pesticides on those crops.

Where both public and private policies formerly provided incentives to develop a highly intensive chemical-based agriculture, these same policies are gradually shifting their incentives to a balanced agricultural production system that will be sustainable over time.

Incorporating Conservation and Wildlife Practices in a Farm Management Plan

Land is a long-term resource, and for most owners, farmland ownership is more of a long-term commitment than a short-term investment. Conservation practices improve long-term profitability, so conservation and profit complement each other.

Develop a Conservation Plan

The best way to improve conservation practices and attract wildlife is with a farm management plan, and many farms could implement long-term conservation and wildlife practices into their farm management plans. The process of developing a conservation plan involves looking at each resource and applying intensive management practices to all resource uses, including conservation and wildlife practices.

Developing a plan will increase the likelihood that things are done correctly the first time. When developing a plan, think about changes and improvements—for example, terraces or plantings—and also about maintenance and further modifications that could be made

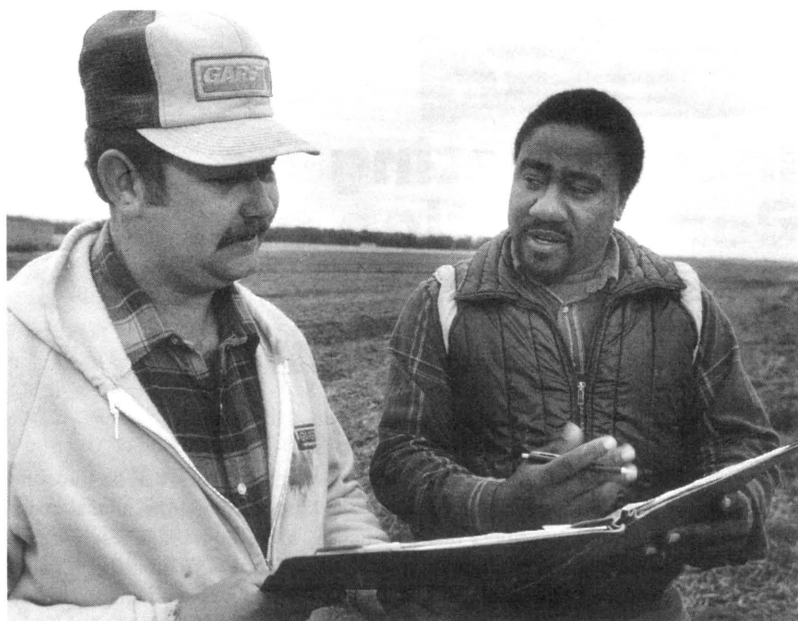
in future years. There will be tradeoffs among initial capital costs, annual maintenance, time, and timeliness factors. Resources are always limiting; in many cases, time and management ability are more limiting than capital or other resources. Rarely can more than one resource be maximized at one time.

When developing a plan, consider several questions. Does the plan make sense? Is it practical for the situation? Is it possible to implement or construct the plan? Can it be maintained over the long term? How can it be broken down?

Establish Priorities. Which projects should be done first? Which projects need to be done at the same time to lower the total costs or because the optimum timing is the same? Will priorities in the plan change if conditions change? Be alert to changes in weather, idle acre programs, financial assistance, costs of materials, and availability of contractors.

Analyze Each Project Financially. Look at tradeoffs. How wide is the time window of ideal conditions versus the

Bill Holstine, Hertz Farm Management, Inc., Nevada, IA, Accredited Farm Manager of the American Society of Farm Managers and Rural Appraisers



Thousands of landowners are protecting their land by developing farm management plans that incorporate conservation and wildlife practices. (USDA photo by Ron Nichols, 88CN1250)

window of acceptable conditions? Are there cost differences between the two windows in implementing the project? What are the odds of success in each of the two situations? Remember, people are more motivated to do the project right the first time if they have carefully studied the financial tradeoffs.

Changes May Take Time

Many farm conservation plans are completed over a period of several years. Seedlings, shrubs, and trees take time to grow and create a habitat. Completing small projects each year will accomplish great things over time. Creating the proper habitat or conditions is important. For example, fish need water and food to live, and other animals need specific types of food and shelter. Specific vegetation does not just hap-



Planting trees on highly erodible land provides permanent wildlife habitats. In addition to providing food and cover for wildlife, the trees and grass protect the soil from devastating effects of soil erosion. (USDA Photo by Ron Nichols, 88BW0664-24a)

pen. Vegetation must be planned, seeded, nourished, and protected.

Soil erosion occurs frequently on saturated soils because they have little structural strength. Installing internal drainage tile allows a firm soil structure to develop and is a key step in controlling erosion. Plant roots will not grow below the water table because they need oxygen, and internal drainage allows vegetation to be better rooted. Waterways are valuable conduits of excess surface water. Waterways often start with internal drainage tile on one or both sides. The tile permits preferred species of grass to be established, which can help firm the soil structure so it can better resist erosion.

Seize the Day

Once a plan is completed, take quick action when ideal conditions occur. An unusual example occurred during a drought in central Iowa. Tile drainage systems and streams quit flowing. This gave us an opportunity to lower the water level of a large pond with pumps. A bench was constructed along the waterline to improve access to and use of the pond. The marshy areas along the banks disappeared where more access was desired. The water was now deep next to the bank, which improved bank fishing. The dirt at the edge of the pond was dry and firm; it could be trimmed and a hiking trail installed. This example shows that droughts offer opportunities to improve areas which normally would be saturated with water. A drought can be an opportune time to move dirt, to improve waterways or stream channels.

Trained personnel from USDA, especially the Soil Conservation Service, can be very helpful. Professional farm managers work with a variety of situations and gain experience which can be transferred to new farm situations.



Game birds, such as this pheasant, are attracted to land improved through conservation practices. (USDA Photo by Ron Nichols, 88BW0849-35)

Their experience includes planning, organizing, seeking cost-sharing, working with contractors, and evaluating how to complete a proper job for the least cost.

Success Is Possible

Our private farm management firm, and professional farm managers in general, have been very successful in incorporating conservation and wildlife practices into farm management plans. Landowners seem quite willing to use available funds to make long-term improvements on their farms. In our experience, two key factors determine conservation and wildlife practices: (1) experience and understanding of what can be done, and (2) development of a plan that includes intensive management of conservation and wildlife practices.

Low-Input Sustainable Agriculture

Is it possible to farm profitably while conserving natural resources and protecting the environment? There are farmers across the country who think so, or at least want to try. The approach they are using, or looking into, is now called “low-input sustainable agriculture” (LISA). This type of farming is giving new meaning to the role of farm management.

What Is LISA?

LISA is a way of thinking about farming. It incorporates some ideas found in what people have labelled ecological, organic, regenerative, biological, or simply alternative agriculture.

Among the goals that now drive the interest in low-input sustainable agriculture, two stand out: profitable and productive farming, and protection of resources and environmental quality. Companion objectives include ensuring safe and nutritious food supplies and reducing health risks to farmworkers.

LISA involves farmers substituting management, scientific information, and on-farm resources for some of the purchased inputs they currently depend on

for their farming enterprises. LISA techniques include rotations, crop and livestock diversification, soil and water conserving practices, mechanical cultivation, and biological pest controls.

Low-input sustainable agriculture offers no magical formula for profitable farming. You will not find a recipe for it in any how-to book. “Sustainable” means the capability to continue producing food and fiber indefinitely and profitably without damaging the natural resources and environmental quality on which all of us depend.

“Low-input” is a catchword for what many feel is a primary requirement for economic and environmental sustainability in farming—the need to cut back on purchased off-farm inputs. These especially include synthetic chemical fertilizers and pesticides, but also livestock growth stimulants.

How can farmers reduce their use of purchased chemicals? Haven’t these purchased inputs made it possible for farmers to specialize and to produce abundantly more than they could without chemicals? Potentially profitable alternatives to the chemical-intensive,

Neill Schaller, Program Director, Low-Input Sustainable Agriculture Research and Education Program, Cooperative State Research Service, USDA, Washington, DC

capital-intensive conventional agriculture can take different forms.

Rotations, soil building practices, and crop-livestock diversification are some of the tools at the farmer's disposal. Legume rotations and use of green manure (crops planted specifically to be plowed under to enrich the soil) can supply plant nutrients, often without making it necessary for the crop farmer to also have livestock as a source of manure. Of course, livestock can serve the additional role of harvesting hay and forage produced as part of the farm's rotation. Soil and water conserving practices, including or in combination with rotations, enhance soil quality and productivity. Rotations also help control weeds, insects, and plant diseases.

With LISA, pests can be prevented or controlled without using chemicals. Mechanical cultivation can substitute for chemical weed killers. And farmers may simply call on their plants to control weeds. For example, rotations and crop diversification may include a crop like rye specifically because it is toxic to weeds. Integrated pest management can play an important role, also. Scouting of fields to monitor insect infestations is one way to limit the use of insecticides to a when-needed basis. Biological techniques, such as use of beneficial insect predators, can often eliminate the need for insecticides entirely. (See Part V, Chapter 5 on integrated pest management.)

The right set of low-input sustainable practices has to be discovered, re-discovered, and honed for each farm. What works on one farm may fail on another. This fact emphasizes the role of farm management. Low-input farmers, in effect, are working to substitute brainpower for chemicals. True, the farm management process for achieving satisfactory low-input farming in-

volves the familiar steps of planning, compiling information, making decisions, buying inputs that the farm cannot produce, selling products, and identifying and solving problems along the way. Depending on the farm for inputs as well as outputs presents greater management challenges. Low-input farming involves experimenting, figuring out how to cooperate with nature and how to benefit from the partnership—rather than concentrating on ways to overcome natural forces.

Why the Interest?

Farmers and nonfarmers alike are becoming more and more interested in this new type of agriculture.

Environmental Quality and Resource Conservation Reasons. Conventional agriculture's reliance on synthetic chemical fertilizers and pesticides has caused or aggravated many problems. Once seen as a basic and beneficial link to our natural environment, agriculture is now widely cited as a cause of pollution. Ground water contamination due to the leaching of agrichemicals is perhaps the environmental problem of greatest concern today. Vulnerability of ground water to contamination is widespread. And unlike surface water, ground water can be very difficult—and sometimes impossible—to clean up once it is contaminated.

However, purchased chemicals are not always the culprits. Excessive leaching of nutrients from livestock manure, a problem in areas such as the Chesapeake Bay region, can be a major source of pollution. Farmers are just as concerned about the ground water problem as anyone. Water in farm wells is often the first to become contaminated.

Water quality is not the only environmental concern. Intensive cropping with heavy use of agrichemicals has often led to adverse on- and off-farm effects such as soil erosion, depletion of irrigation water supplies, and loss of fish and wildlife habitats. Despite efforts to curb erosion spanning 5 decades, loss of topsoil persists in lessening the productivity of farmland and causing sedimentation and other runoff problems estimated to cost billions of dollars a year to correct.

Economic Reasons. Farmers, though concerned about adverse environmental impacts of conventional farming practices, must make a decent living. In fact, it took the farm financial stress of the 1980's to raise substantial farmer interest in reducing chemical inputs in order to survive financially. Many farmers began to see low-input sustainable agriculture as one way to cut their production costs and debts, and therefore stay in business. Growing farmer interest in the economics of low-input agriculture has helped to broaden the idea to accommodate reduced-chemical as well as no-chemical practices.

The economic rationale for low-input sustainable farming has other roots. Farmers remain concerned about the rising costs and uncertain availability of pesticides. Over time, weeds and insects develop a resistance to previously effective pesticides. So farmers have to use more of those chemicals or alternative chemicals more often just to stay even with new pest resistances. The use of many of the pesticides they have come to depend on could be banned or restricted quickly if they are found to cause unacceptable health risks. The costs to chemical companies of developing, testing, and registering pesticides is going up, which means higher and higher future pesticide costs to farmers.



As barley is harvested at right, soybeans are planted in barley stubble. By using conservation tillage in a double cropping system, the farmer protects the soil from erosion, while saving time and fuel. (USDA Photo, MD-30616)

Thus, many farmers are thinking seriously about low- or even no-chemical alternatives.

Food Safety and Quality Reasons. If the combination of environmental and economic concerns has not been enough to boost interest in low-input sustainable farming, public concern about the safety and quality of the food we eat adds another reason. Issues such as pesticide residues on food and the use of growth stimulants in livestock move into and out of the headlines with increasing regularity. Whether real or imagined problems, they increase interest in profitable farming approaches that will prevent rather than just contain undue health and safety risks.

Does LISA Really Work?

There are really two questions concerning LISA: Can LISA lead to an agriculture that is environmentally beneficial and assures us of safe and wholesome food? And will LISA be profitable for farmers?

Skeptics say you can answer "yes" to only one of these questions. Believers in low-input sustainable agriculture cite case studies showing that many farmers using low-input practices are doing as well as, if not better than, their conventional counterparts. The following chapter in this book describes some of those farms.

Still, there are formidable barriers that would have to be surmounted if low-input sustainable agriculture is to become mainstream agriculture. One barrier is the lack of adequate information that farmers need to make wise decisions about practices that will work best for them. USDA and land-grant universities are just beginning to develop and disseminate information on low-input sustainable farming.

A new but small Low-Input Sustainable Agriculture Research and Education Program, administered by USDA, is giving the need for low-input farming facts and information important visibility and support.

Current farm and other public policies may also be potential obstacles to adoption of low-input sustainable agriculture. Price and income supports for major crops like corn, wheat, cotton, and rice continue to raise artificially the economic returns to farmers for producing those crops on as many acres as possible. The base acreage provisions in commodity programs that are used to determine the payments each participating farmer can receive have had the unforeseen effect of discouraging a shift to other enterprises that might be produced with a lower level of inputs. Shifting to these enterprises may mean using, and therefore losing, some of that crop "base" in order to grow rotation and other crops.

The Challenge Ahead

To some people, low-input sustainable agriculture will always seem like a step backward, a return to the way we farmed before chemical fertilizers and pesticides became widely used. They point to the impressive gains in yields attained since World War II when we began to use synthetically compounded fertilizers and to apply what had been learned about chemicals in controlling agricultural pests. They note the great reduction in the drudgery of the labor-intensive methods that accompanied farming in earlier decades.

But from all indications, low-input sustainable farming need not sacrifice those gains. In fact, it seems to involve a sophisticated combination of the best of past methods along with low-input practices, creating a system that may require only a modest increase in labor requirements over those of conventional farming.

The challenge ahead is to help farmers improve their management abilities, to give them the information they need to make informed decisions, and to remove barriers to the adoption of profitable and environmentally benign agriculture. For in the end, the extent to which farmers are willing and able to develop and profitably apply low-input sustainable management skills will have a big impact on the future of American agriculture and on the quality of our environment.

Farms that Succeed Using LISA

Many people wonder whether commercial scale farms can succeed financially while farming with low-input sustainable agricultural (LISA) systems. (See Part V, Chapter 3.)

Dozens of successful cases have been documented, although many other farms have failed financially or have suffered major losses during their efforts to reduce the use of purchased inputs.

How does a farmer succeed in adopting LISA farming practices? Three essential steps are to: overcome prejudices against such methods, avoid the lethal pitfalls, and build a gradual transition strategy.

Overcoming Prejudices

Because "organic farming" became popular in the counter-culture movement of the 1960's, many farmers equate any effort to reduce the use of purchased inputs with "hippies," and impoverished back-to-the-earth groupies. Farmers who are good managers (that is, the ones who are still in business) are not easily taken in by grateful testimonials of "true believers" who claim that all you have to do is stop

using purchased inputs such as chemicals—go cold turkey.

While a healthy skepticism is a good device against fantasy, a totally closed mind is a barrier to progress. If a farmer firmly believes that low-input methods are impractical and inherently unprofitable, this belief can become a self-fulfilling prophesy. An increasing number of main-line, commercial-scale farmers are adopting low-input farming methods.

In recent years, credible success stories have appeared in the agricultural press, such as *Farm Journal*, *The Furrow*, *AgriData News*, and the *Landowner*. Such respected publications as *The New York Times*, *The Washington Post*, *The Des Moines Register*, *Newsweek*, and *The Economist* have carried stories describing farms that have operated profitably for many years with little or no use of agricultural chemicals. And while stories such as these do not provide scientific proof or a guarantee of success, they do illustrate interesting possibilities.

As noted by the U.S. Senate in its 1988 appropriations bill for LISA pro-

J. Patrick Madden, Head, Madden Associates, Glendale, CA, and member, management team, USDA's LISA grants program

grams, "A growing number of farmers are now looking for reliable information on reduced input farming systems." The key is "reliable" information.

Avoiding Mistakes

Realizing the risks and difficulties of making a transition from chemical-intensive to low-input farming systems, a number of private and public organizations offer guidance on management mistakes that should be avoided. Many publications and conferences are being offered by sources such as the Institute for Alternative Agriculture in Greenbelt, MD; the Leopold Center in Ames, IA; the Rodale Institute's New Farm magazine; the Extension System; the Northern Plains Sustainable Agriculture Society in Windsor, ND; the Kansas Rural Center in Witing, KS; the Land Ste-

wardship Project in Stillwater, MN; the International Alliance for Sustainable Agriculture in St. Paul, MN; California's Committee for Sustainable Agriculture in Colfax, CA; and the Alternative Energy Resources Organization in Helena, MT.

For example, Fred Kirschenmann's report, "Switching to a Sustainable System," published by the Northern Plains Sustainable Agriculture Society, draws on his own farming experiences and those of other farmers who have struggled through the transition. His advice:

- Don't move too fast. Changes take time. Give the soil time to regenerate itself.
- Don't just stop using chemicals. A sustainable system has more to do with what you put into place than it does with what you stop doing. To just stop using chemicals without putting a regenerative system into place is a guaranteed prescription for disaster.
- Don't go cold turkey. Try out sustainable strategies on a small scale, monitor the results, make adjustments, then try them again on a larger scale. A big mistake on a small number of acres turns out to be a small mistake. A small mistake on a large number of acres turns out to be a big mistake.
- Don't continue monocropping. Monocropping can be maintained only through large infusions of fertilizers and pesticides. In order for a sustainable system to work, it needs the diversity of a good crop rotation system.
- Don't start with more acres than you can afford to risk. Changing systems always involves some risks. Switching to a sustainable system is no exception. No matter how successful your neighbor's sustainable system may be, yours might need to be different. Every farm is unique. Every farmer is



Low-input farming practices have many applications. This Nebraska farmland is planted with soybeans and wheat, two crops that overlap in growth cycles. This method reduces land preparation costs, saves water, and provides a 90 percent wheat crop and 50-70 percent soybean crop all in one year. (University of Nebraska photo by C.A. Francis)

unique. The grower and the land need to discover each other and together they need to find ways to care for each other and sustain each other. This is part of the joy and the challenge of sustainable farming.

Kirschenmann's report offers sage advice for all farmers planning to start a transition to low-input sustainable systems, with special relevance to dryland grain and livestock farms in the Great Plains. Innovative farmers with other types of farms in different climate and soil conditions have developed their own lists of mistakes to avoid. One of these mistakes is producing crops for which there is little or no market, or relying on a premium price for "chemical free" produce in small local markets that are easily saturated.

Another common mistake is going deeply into debt. An example of essentially debt-free farming is given in one of several case studies presented by the Kansas Rural Center. Between 1983 and 1987, Rick Busch and his wife Nancy Vogelsberg-Busch accumulated a \$55,000 increase in net worth on their 400-acre, crop-livestock farm, without incurring any liabilities other than some small, short-term loans for equipment.

There is no magic formula or "silver bullet" for adoption of low-input methods. Methods that work on some farms may fail on others, for a lot of reasons. For example, Rich Theiltges, a Montana farmer characterized as "sympathetic with the organic movement," has nonetheless expressed skepticism about many regenerative agriculture methods being promoted today. In two out of three years, he has had difficulty establishing sweet clover as a green manure crop (a crop that is planted specifically to be disked under to add organic matter and nitrogen to the soil). He is also discouraged with the legume black

medic as a green manure crop, because of the small amount of biomass it produces in competition with a winter wheat crop. "I just can't see that it's going to take over conventional farming," he said.

In contrast, in an economic comparison of conventional and low-input cropping systems in Washington State, researchers developed a very promising crop rotation with black medic, peas, and wheat. When crops were valued at current market prices (ignoring Government deficiency payments) this low-input rotation was estimated to be more profitable than a conventional rotation that incurs a 4.8 times higher cost for chemical fertilizers and pesticides—a net return of \$61 versus \$47 per acre. When deficiency payments were included in the prices of the wheat barley, however, the conventional rotation became the most profitable method.

A common mistake is to draw causal but faulty conclusions from direct on-farm experience. For example, suppose a farmer abruptly changes his or her method of pest control on the entire farm from one year to the next, and a major pest problem is vastly improved. Lacking any comparison plots on the farm (where alternative treatments including last year's methods are tested) the farmer may conclude that the improvement is entirely the result of the new method. While this conclusion may be correct in some circumstances, it is very likely that other factors, such as a year-to-year change in weather and the resulting increase in the population of a natural enemy of the pest, may be the major cause for the improvement. Dick and Sharon Thompson avoid this common mistake on their 320-acre Iowa farm by always using comparison strip plots when innovative methods are tried.

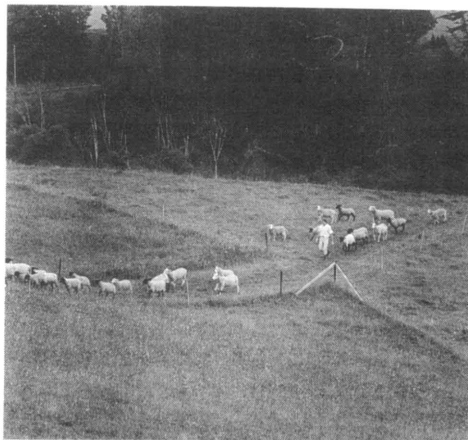
Strategies for Change

Always remember that changing systems involves risks. This is one reason why so many farmers are reluctant to switch from chemical-intensive to low-input systems. The primary purpose of the USDA's new Low-Input Sustainable Agriculture (LISA) program is to reduce these risks by improving the productivity and the profit potential of low-input methods, and making reliable information readily available to farmers. One of the approaches being used is to form project teams including farmers, scientists, and educators. Scores of farmers using low-input methods have come forward offering to become directly involved in the LISA program. The experiences of innovative farmers can guide the hypotheses to be tested in research studies, using a combination of on-farm and Experiment Station research.

For example, LISA experiments being conducted at the University of Georgia Plant Science Farm include three methods of controlling fungus disease in peaches: organic, low-input, and conventional. The organic treatment was designed in consultation with the Georgia Organic Growers Association; the conventional treatment consisted of spraying the entire orchard with fungicide; the low-input option was to spray alternate rows rather than every row. Brown rot was controlled equally well with all three treatments. Control of two other insect pests was slightly less effective in the organic treatment, with differences ranging from 2 to 5 percent. The low-input (alternate row) method of spraying provided slightly better results than conventional (every row) spraying to control a heavy infestation of certain pests.

A long-term experiment comparing conventional no-till crop rotations with

crop rotations using low-input chemical inputs was started by scientists in North Carolina in 1986 and expanded with LISA funding in 1988. All 3 years of the study have had summer droughts. Weed infestation, especially of johnson grass, has been severe in the experimental plots, so herbicide costs in the conventional plots were unusually high. Corn yields in low-input plots (with minimal use of herbicides) were found

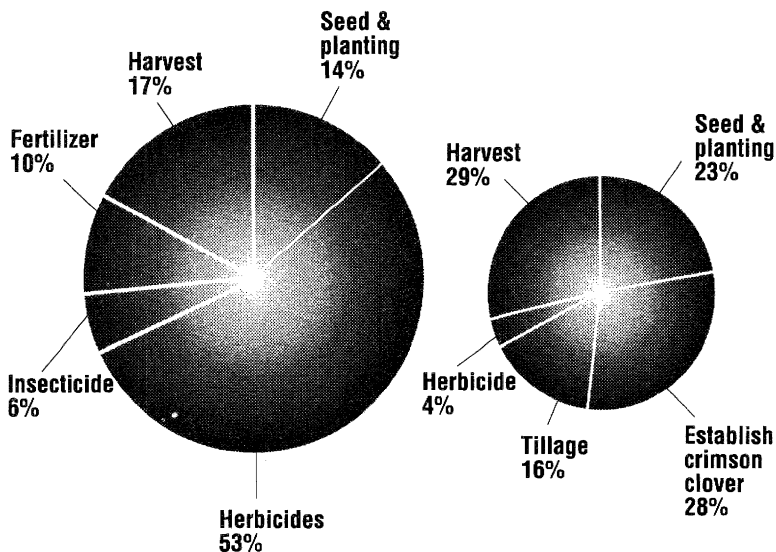


As part of a pasture management program, this Vermont pasture is partitioned into a number of small areas. Livestock are rotated from one area to another, allowing the forage to mature. (University of Vermont photo by Owen Stayner)

to be lower than those of conventional (pesticide-based) crop rotations, but higher than yields of conventionally produced continuous corn. Because of the drought, yields were below normal and most of the net returns were negative, but losses were smaller in virtually all the low-input plots than in the conventional plots. The largest difference occurred in the corn experimental plots during 1987, when the conventional plots incurred a net loss of \$171 per acre, compared with a net loss of \$95 per acre in the low-input plots (see

Costs—Conventional and Low-Input Management, 1987

Corn



Conventional Management

Total costs per acre: \$218
Net returns per acre: \$-171

Low-Input Management

Total cost per acre: \$128
Net returns per acre: \$-95

Note: Herbicide was used after corn harvest in 1986 and again before planting in 1987, mainly to control johnson grass.

pie chart). For soybeans during 1987, the net return from the conventional plots averaged a loss of \$9 per acre, compared with a profit of \$17 per acre under low-input management.

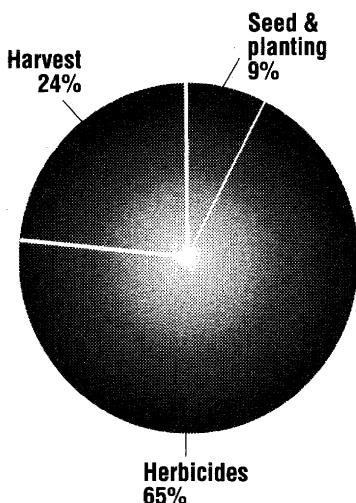
Other successful projects include a multi-State LISA project at Cornell University where scientists have found a nonpesticide method for reducing the population of a major pest of grapes. In Texas, solarization is reducing nematode populations by 85-90 percent, compared with 90-95 percent control by chemical fumigation. In South Dakota, there is a new approach to control the

corn rootworm pest: Under test conditions, a bait with significantly less insecticide kills 94 percent of adult corn rootworms with no harm to beneficial species.

These projects indicate the kinds of technologies being developed and tested under the LISA program. Certainly not all low-input methods being tested are proving to be profitable, but in general, the outlook is optimistic for the farmer who works to succeed using LISA.

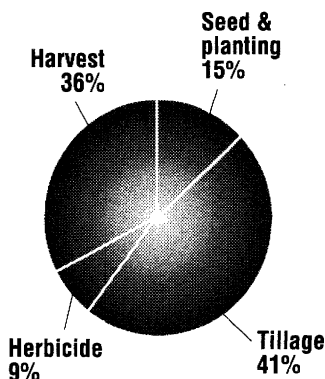
It is particularly encouraging that a large and growing number of scientists and educators in universities and the Extension System, as well as farmers and

Soybeans



Conventional Management

Total costs per acre: \$154
Net returns per acre: \$ 9



Low-Input Management

Total costs per acre: \$104
Net returns per acre: \$ 17

Source: Larry D. King, "Low-Input Cropping System Experiment," Dept. of Soils, North Carolina State University, Raleigh, NC. First annual progress report on LISA project, January 1989.

others in the private sector, are forming project teams to study and develop LISA methods that can contribute to the success of the farmer who chooses to use LISA practices.

For more information, see *Profitable Farming Now!*, by Mike Brusko, George DeVault, Fred Zahradnik, Craig Cramer, and Lisa Ayers (ed.), Regenerative Agriculture Association, Emmaus, PA, 1985, and *Reshaping the Bottom Line: On-Farm Strategies for a Sustainable Agriculture*, by David Granatstein, Land Stewardship Project, Stillwater, MN, 1988.

Integrated Pest Management Systems: Protecting Profits and the Environment

Integrated pest management (IPM) is an ecologically based, environmentally conscious method to control plant pests. IPM combines, or integrates, biological and nonbiological control techniques to suppress weeds, insects, and diseases.

Contemporary IPM programs address the potential adverse health and environmental effects of widespread pesticide use, as well as the decreased effectiveness of some chemical pesticides because many pests have developed increased resistance to these substances. IPM customizes the use of a variety of pest suppression techniques for individual situations; it uses pesticides sparingly, and only when economic conditions dictate. Consequently, IPM has played and will continue to play a major role in reducing or eliminating pesticide exposure to humans, contamination of the environment, and pesticide threats to endangered species—all while providing economic advantages for farmers.

In the late 1960's, Dr. Ray F. Smith and Dr. Harold T. Reynolds of the University of California introduced the IPM concept, defining it as "a pest population management system that utilizes all suitable techniques in a compatible manner to reduce pest populations and maintain them at levels below those causing economic injury." For 20 years, the IPM approach has played a major role in reducing the damaging effects of pesticides on people, ground water, and wildlife.

Virtually all land-grant universities, as well as USDA and the private sector, have implemented IPM systems for most agricultural commodities. The principles of IPM have also been used to develop excellent pest control programs for structures and landscapes in urban areas.

IPM Is Born

Two research projects conducted between 1972 and 1985 brought the IPM

Raymond E. Frisbie, Professor and Extension IPM Coordinator, Department of Entomology, Texas A&M University, College Station, TX, and

John M. Luna, Assistant Professor, Department of Entomology, Virginia Polytechnic Institute and State University, Blacksburg, VA



Agricultural Research Service plant pathologist Kenneth Deahl finds Colorado potato beetles have done little damage to new insect-resistant potato plants. (USDA Photo by Tim McCabe, 0687X534-11)

concept to the cutting edge of farm management. Both were cooperative efforts between several universities, the U.S. Environmental Protection Agency, the U.S. Department of Agriculture, and the National Science Foundation. The Huffaker Project, which took place between 1972 and 1978, investigated insect and mite pest problems of five major commodities—alfalfa, apples, citrus, cotton, and soybeans. The Consortium for Integrated Pest Management expanded that research to include all major pests (insects, diseases, and weeds).

As a result of these two projects, system science and computer modeling became central to the study of pest problems and their management. These projects led to other significant advances in the science of pest management, as well. For example:

- Biological sampling of pests, which showed that pesticides could be applied later in the growing cycle—at the point of economic damage,
- Using pest-resistant crop varieties,
- Using natural enemies for biological control,

- Quantifying economic and environmental values of IPM systems, and
- Using the Cooperative Extension Service (CES) to help farmers implement the new technology.

Using IPM Systems

Advanced IPM systems can factor in nearly all the variables in crop or livestock production. In developing an overall pest management plan, consider these tactics:

- Use pest-resistant plant varieties adapted locally from disease-free stocks,
- Adopt farming practices that discourage pest development, such as carefully planned planting and harvest dates, cultivation techniques, water and fertilizer management schemes, and destruction of pest-harboring crop residues,
- Introduce pests' natural enemies into the production system, such as parasites, predators, pathogens, or competitors for food,
- Use crop/pest models and environmental monitoring to predict pest occurrence,
- Monitor levels and types of pest infestations,
- Develop economic thresholds at which damage by pests is economically significant and warrants pesticide application,
- Select and time the application of the most environmentally safe pesticides when economic thresholds are reached,
- Periodically evaluate the economic, environmental, and social benefits of pest management,
- Regularly contact your local Cooperative Extension Service for the latest information about IPM techniques.

IPM Successes

Integrated pest management makes good economic sense. By 1987, an

evaluation of IPM programs in 15 States documented that IPM users overwhelmingly showed a profit while reducing their use of pesticides. In these States, farmers using IPM increased their net profits over non-IPM users by an estimated \$578 million per year. The evaluation estimated that private pest-management consulting firms may bring in revenues exceeding \$400 million per year. It is easy to understand why IPM programs have continued to be emphasized by many Cooperative Extension Services despite constantly diminishing Federal financial support.

The advantages of IPM are as varied as the circumstances under which the system is used. Virtually all farmers, regardless of the size of their enterprises, can benefit from integrated pest management. Consider these case histories:

Cotton. Coordinated by the Texas Agricultural Extension Service, a regional cotton production program in the environmentally sensitive, lower Rio Grande valley utilizes a range of IPM tactics. The program is applied to 450,000 acres and has emphasized cultural rather than chemical methods of pest control to increase profits by \$31

million per year and reduce insecticide use by an estimated 650,000 pounds per year. Cotton IPM programs in other regions of the State have saved Texas farmers \$8.43 billion by decreasing expenditures on pesticides and increasing yields.

Among the strategies farmers have used to accomplish these results are:

- Short-season, pest-resistant, varieties,
- Optimal planting dates,
- Reduced water and nitrogen fertilizer usage,
- Pest simulation models,
- Detailed season-long monitoring of pest populations and plant conditions,
- Pesticide selection and timing of applications based on monitoring results and economic thresholds,
- Preservation of natural enemies of pests, and
- Harvesting early and destroying plant residue to remove pest harborage.

Soybeans and Corn. In the Midwest, corn and soybean farmers face significant pest problems from insects, weeds, and diseases. IPM tactics, incorporated with the use of corn/soybean rotations rather than continuously growing one crop or the other, have resulted in uniformly higher and more sustained yields. They also have netted larger profits for farmers and reduced the economic risks associated with continuously growing just one crop.

In addition to the use of crop rotations, important IPM tactics used for Midwest soybean and corn production include:

- Appropriate tillage practices,
- Disease- and pest-resistant varieties of corn and soybeans,
- Pest simulation models that predict pest infestations,
- Field monitoring of pest levels and crop conditions,



Colorado potato beetles take only a bite or two of this insect-resistant potato plant developed by USDA scientists before they are repelled. (USDA Photo by Tim McCabe, 0687X533-22)

- Natural enemies, and
- Economic thresholds for pesticide application.

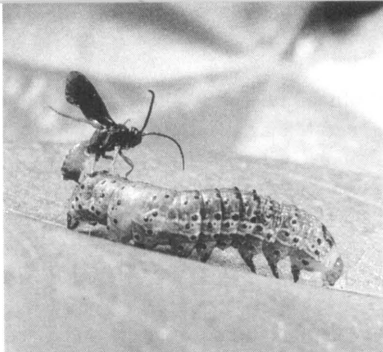
Livestock. Farmers and ranchers have made considerable advances in utilizing IPM strategies for livestock production throughout the United States. Significant control has been achieved over external parasites. Some of the greatest accomplishments have occurred in controlling house flies in confined livestock operations—beef and swine feedlots, dairies, and poultry houses. Environmentally sound IPM systems for livestock have played a major role in reducing pesticide exposure to humans and animals, and in reducing the potential for surface and ground water contamination.

IPM tactics used to address fly management are:

- Improved design and construction of confined animal facilities to reduce harborage and improve ventilation,
- Better sanitation of feed and manure handling to disrupt fly breeding and growth,
- Reduced moisture, which flies require for development,
- Use of natural enemies (particularly introduced parasites and predators),
- Monitoring of fly infestations,
- Use of fly baits and traps, and
- Selected use of pesticides.

Vegetables. Reducing pesticide residues in food has become a health issue of national concern. The vegetable industry has historically relied heavily on the use of pesticides to meet consumer demands for blemish-free fresh produce, as well as Federal standards limiting the number of insect parts in processed vegetables. IPM has offered ways to reduce dependence on pesticides to meet these standards.

An IPM program for California tomatoes, for example, centers primarily



*The parasitic wasp *Microplitis croceipes* lays her eggs in *Heliothis virescens*, the tobacco budworm. By putting this natural predator to work, scientists hope to control members of the genus *Heliothis*, which causes massive amounts of damage to cotton, corn, soybeans, tobacco, and other crops. (USDA Photo by Tim McCabe, 88BW0705-14)*

on field sampling insect populations and associated plant damage, and has significantly reduced the use of insecticides. Insecticide use dropped 12 percent in mid-year planted tomatoes and 40 percent in late-year planted tomatoes, with no loss of yield or quality.

In Texas, a vegetable IPM program has centered on carrots used in baby food, soups, and frozen foods. A cooperative effort between Gerbers, Inc.; Campbell Food, Inc.; and local farmers resulted in reductions of insecticide use by 66 percent. Texas farmers have also used IPM for cabbage, with an emphasis on the major cabbage pest, the diamond-backed moth. Cabbage growers reduced insecticide use by 44 percent.

As with the California tomato program, yield and quality did not suffer, and net profits increased. In addition to these innovative programs in California and Texas, excellent IPM schemes have been developed for potatoes and sweet corn in the Northeast.

Hay. In Oklahoma, IPM provided the initial focus to a cooperative effort between hay producers and Oklahoma State University Extension and research faculty to dramatically improve hay

profitability. The resulting Alfalfa Integrated Management program increased farmers' net profits by an average of \$12.15 per ton of hay. The program was based on a systemic evaluation of hay production economics, after which the interdisciplinary team recommended comprehensive management consisting of not only IPM for insect and weed control, but also:

- Stand development,
- Variety selection,
- Soil fertility maintenance,
- Improved harvesting, storage, and distribution techniques,
- More effective marketing strategies.

Working with Nature

The key word in all IPM programs is "integrated." In other words, farmers should consider all the pest-control methods available to them to reduce their reliance on pesticides. Introducing biological enemies of pests in an IPM program offers an ecologically desirable alternative to pesticides.

Controlling pests biologically is more than just preserving naturally occurring pest enemies. In many cases, pests enter the United States from foreign countries, without their full complement of natural enemies (parasites, predators, and pathogens). A major focus of IPM must involve the discovery and importation of natural enemies from pests' native habitats.

Several cases of importing exotic natural enemies have led to successful biological pest control programs. The vedalia beetle was imported to California 100 years ago, for example, and saved the State's citrus industry from cottony cushion scale. In more recent years, the importation of pest enemies has saved pastures, livestock, sugar, ornamental plants, and other commodities. Importing natural enemies also has controlled range and aquatic weeds.

Another technique of biologically controlling pests involves periodically releasing natural enemies reared specifically for pest-control purposes. This technique has been particularly successful in controlling spider mites in fruit crops and in closed environments such as greenhouses.

Insect diseases have long been known to reduce pest populations in nature, and several diseases are now cultured for commercial use. The best known is the bacteria *Bacillus thuringiensis*, commonly called B.t., which is available as an insecticide for most kinds of cropping systems, including forestry. In addition, *Alternaria cassiae* and *A. macrospora*, two kinds of fungus, are commercially available to control weeds that grow in soybean crops. Viruses can be used to attack disease-causing bacteria as well as other viruses.

Profitable, Effective, Environmentally Sound

IPM programs have clearly demonstrated their utility, as well as their profitability, and IPM is likely to play an increasingly significant role in the future of U.S. agriculture. Because IPM systems can be customized to address specific problems, they can accommodate a wide range of agricultural and environmental needs. Preservation of natural resources and the protection of human health must be considered in pest control systems for crops and livestock. As the adverse effects of pesticides become more widely known, demands for the kinds of alternatives IPM can provide will increase. And the uses of IPM will not stop with agriculture. The future will call for expanded programs not only for food production, but also for protecting buildings and landscapes in the urban environment.



Part VI

For More Information:

How and Where To Get

Information You Need

Where and How Do Farm Managers Get Useful Information?

The right information at the right time can mean success or failure for the farm manager. While this dictum may seem simple, it is complex and requires the farm manager's continual investment of time and money.

Farm managers make decisions. Good farm managers make good decisions. And good decisions are based on relevant information and logical analysis.

When economic, political, and social conditions change rapidly (as they do today), risk from the wrong move or from failure to move is great. Information that can help the farm manager stay abreast of these changes is of great value.

Types of Information

Many types of information are useful and essential to managing a farm business. Two major categories are internal and general application information.

Each farm business system possesses certain unique internal information. No two farm businesses are exactly alike. The quality and condition of a farm's

resources—the land, buildings, machinery, livestock—will differ from one farm to the next. The most unique resource is often farm management (often, a husband-wife team) with a particular set of talents and experience.

Internal information about the farm business can best be captured by a good farm recordkeeping system. It is used in developing production budgets necessary for management decisionmaking.

General application information is that vast amount of information produced by both public and private sources. General application information has a bearing on the outcome of decisions that farm managers must make. Since farm units differ, the kind and amount of information needed for each farm differs. The type, location, and size of farm, ages of the owners, goals of the families, enterprises involved, restrictions on resources, as well as numerous other characteristics are important in determining the farm manager's kind of information gathering system—that is, the kind of information that is of greatest value and the best way to obtain this information.

Tom Brown, Professor Emeritus of Agricultural Economics,
University of Missouri, Columbia, MO

Information Sources Change

Over the past few decades, there has been a shift in the sources of information available for farm managers. Following World War II, publicly financed institutions were the predominant source of new information discovery (research) and education (Extension teaching). Gradually, private businesses spent more and more money on research and development. Privately-funded research has been aimed at developing useful products that can be sold to consumers at a profit. Education programs (advertising) have distributed information to encourage specific action, usually by a targeted group.

The media are very important in providing information to farm managers. Farmers read farm magazines, as well as reports about new production technology and its adaptation to specific farms. In recent years, the trend has been toward more specialized publications rather than general ones.

Radio and newspapers continue to play a major role in reporting market news, as volume of sales and trading prices can be reported quickly and efficiently. Radio and television are the dominant channels for conveying immediate weather information. While newspapers and magazines carry articles on long-range weather forecasts, farm managers make minimal use of this information in managing their farm businesses.

During the past decade or so, an increasing number of specialized newsletters have appeared. Marketing letters have been very popular. Public issues, farm policy, and international affairs also are subjects that can be communicated via newsletters to a specially targeted audience.

Research conducted in the late 1970's ranked the following information in terms of value to the farmer and listed the most important source.

Farmers' Ranking of Information Sources

Rank	Kinds of information	Most important source
1	Production technology (application of improved methods and products in farm production)	Cooperative Extension Service
2	Marketing (deciding when, where, and how to sell farm products)	Marketing firms
3	Weather	Radio
4	Business management (planning enterprise adjustments, firm growth, financing, estate and income tax management)	Consultants
5	Farm policy (allotments, quotas, price supports, conservation, disaster aid, etc.)	Agricultural Stabilization and Conservation Service, USDA
6	Purchasing supplies (deciding what, where, and when to buy farm supplies)	Suppliers of purchased inputs
7	Public policy (understanding public issues and regulations that affect the farm, such as environment, health, safety)	Farm magazines

Information for Change

Before a change can occur, the manager must become aware of the potential change. Farm managers can learn of these potential changes by reading a farm magazine, watching television, or seeing a demonstration at a fair or show. Continual exposure to the potential change may stimulate a spark of interest and cause the manager to look into the matter. Inquiries may be made of trusted sources of information to appraise what the outcome of change would be in the manager's situation. The advantages and disadvantages would be weighed. When the potential change appears to offer definite advantages, it will be tried on a small scale if possible. If the manager likes the results, it may be tried on a larger scale and finally completely adopted or rejected.

Information must be understood by the manager if it is to be useful. The way the information is received and its source affect the understanding. Research indicates that the age, level of education attained, and amount of income of managers influence which sources of information have the greatest credibility. Institutions and businesses build their credibility by continuing to deliver the results they promised.

As information sources become more complex, albeit more complete and accurate, the sources require specialized training and equipment for use. As commercial farms have grown in size and as farm technology has become more complex, it has become more feasible to hire specialized consultants to perform certain functions that farm managers formerly did themselves.

The advent of the computer has opened up a new world of information distribution and retrieval. A survey of

midwestern farmers indicates that 9.4 percent owned computers but only 5 percent used them to any significant degree in managing their farms. In some cases, the computer helps the farm manager to make better decisions, but certainly not in all cases. While it is possible to access large quantities of data, this will not guarantee better decisions. It is possible to become so inundated with data that the manager becomes bogged down and is unable to make good decisions.

Tailor Your Information System

Every farm manager must collect, store, and interpret information to use in making decisions for the farm business.

The following steps may serve as a useful guide:

1. *Keep a good set of records on your farm business.* Keeping financial records for taxes is a start, but you also need to record quantities, yields, and prices so you can build reliable enterprise budgets. Help may be available in your State from the Cooperative Extension Service.

2. *Subscribe to a large number of publications.* Do not limit yourself to publications in your field. Good ideas can come from lots of places.

3. *Prepare, in writing, a long-range plan for your farming operation.* The plan should cover a period of 10 years. Annual adjustment may be needed as conditions change. Be sure you have clearly stated your goals and your family's goals. Seek assistance if necessary in preparing the production plan, marketing plan, and financial plan.

4. *Identify areas where you need personal improvement.* Select one area to work on a year. Take advantage of

courses available. Remember you are making an investment in your future management capacity.

5. *Become active in organizations or activities important to your farming interests.* Your association with managers of similar businesses will be a source of ideas to stimulate your thinking and broaden your perspective.

6. *Build a network of business confidants.* Knowing where you can get sound advice on matters important to your farm business is of utmost importance. Do not wait for a crisis. Some good possibilities are County Extension Agents, Area and State Extension Specialists, attorneys, accountants, co-op field workers, farm organization representatives, input suppliers, and marketing firms.

Proper Fit

A good information gathering system, like a good pair of shoes, must fit the manager or it will not get used. Data collected and unused are wasted. Data that are misinterpreted may be highly dangerous to the health of the farm business. Sophisticated computerized data collection and analysis systems can be a real boon to farm managers if they can use the systems; if they are not used, the systems are an expensive frustration. Most new techniques require an investment of time and money in learning new skills to use the equipment and operating methods effectively.

A successful farm manager must continue to grow on the job. A good information system not only makes this possible but is a major force in causing it to happen.

Filtering Information for Decisionmaking

Farmers and ranchers are bombarded with information. Filtering information is a process for determining which information is worth further consideration. It includes deciding which newspapers, magazines, bulletins, and "junk" mail to read, and what to throw away. Filtering information guides managers in using their time and resources to attend educational meetings, observe practices of farmers and ranchers, and participate in other information gathering activities.

Decisions must frequently be made with incomplete knowledge. Major sources of uncertainty include technological developments, weather, market conditions, and policy issues—including Government programs and changes in fiscal and monetary policies. These factors and others interact, increasing risks. These uncertainties underscore the need for filtering information and improving decisionmaking.

How a farm manager decides which information to use is a complex and individual process. There is no single or "best" way to filter information. How-

ever, there are certain factors that should be considered when making decisions and several tips for filtering information that can lead to improved decisionmaking.

Internal and External Decisions

The personal nature of decisionmaking is vividly illustrated by what constitutes an important decision for a farm family. The classification of a decision as important or unimportant is influenced by a farm family's goals. Goals are, in turn, influenced by the life cycle of the farm business. Is the manager starting, expanding, consolidating, or transferring the business to another generation?

Some managers are innovators and early adopters of technology. While some are content with "just getting along," others are attempting to maximize their net income. The importance of information and decisions will vary considerably among these individuals.

Many decisions are external to the business. As a farm manager, you

Clark D. Garland, Professor of Agricultural Economics, University of Tennessee, Agricultural Extension Service, Knoxville, TN



Dane and Kim Mercer from Monroe County, TN, discuss the probable economic consequences of a major management decision with Bob Sliger, Extension Leader, and David Perrin, area farm management specialist. (Photo by Nancy C. Cann, University of Tennessee)

should realize you have no control over some of these decisions. Concentrate on the impact these decisions will have on your business, and explore the probable consequences of alternative responses to the decisions.

Analyze Your Decisions

Decisions can be classified in many ways. Emery N. Castle and Manning H. Becker, in their book *Farm Business Management*, classified decisions commonly faced by managers according to importance, frequency of occurrence, urgency of action, flexibility, and available alternatives.

What difference will it make if the decision is made one way or the other? There are \$10, \$10,000, and \$100,000 decisions. Managers should allocate their time in filtering information concerning these decisions in terms of the relative importance. For example, a decision on whether to produce one crop

or another is relatively more important than deciding which recommended variety of a given crop to plant.

Some decisions are made only once or twice in a lifetime. Other decisions are made daily. Certain daily decisions, such as what and how much to feed livestock, can become routine. By developing a feeding program and continuing with it until changes are needed, the number of daily decisions can be reduced. This simplifies filtering information for decisionmaking.

However, simplification does not reduce the importance of feeding decisions. The decision for a given day is not extremely important. However, the cumulative effect of the decision is extremely important. It could easily determine the level of success of the farming operation. Farmers and ranchers should evaluate options carefully before developing the overall feeding program and monitor the three or four key fac-

tors which could justify changing the program.

Some decisions are more flexible than others. Once some decisions have been made, it can be expensive to change them. For instance, if a farm family decides to start or expand an enterprise requiring relatively expensive specialized buildings, it can be costly to reverse the decision. Generally speaking, these structures add far less to property values than their cost. This does not necessarily mean that these structures should not be built. However, pay specific attention to filtering information and determining the true goals of the family. The value of the structure will normally need to be “farmed out” of the operation. If individuals decide to simply try out an enterprise requiring specialized structures, and then decide to discontinue their use within a short period of time, the family can lose more money on the reduced value of the structures than many families expect to accumulate over a lifetime. Always consider what it will cost to reverse a decision.

Some decisions have only two alternatives. Others may have many alternatives. To properly filter information, the number of alternatives to be considered for detailed analysis should be tentatively reduced to a manageable number. When filtering information for an excessive number of alternatives, it is possible to get confused and lose sight of the decision that must be made.

Filtering Information

Decisions are made on the basis of logic, custom, habit, hunch, or just on what the manager wants to do. Probabilities for financial success are greatly improved when logic is used for decisionmaking. Excellent farm management planning tools are available to help

the farm manager in applying logic to decisionmaking. However, you must obtain and evaluate relevant information. This requires time and additional resources. Planning tools—such as record analysis, budgeting, and whole farm planning—provide a framework for obtaining the full value from information available to the manager. Likely outcomes from alternative decisions can be evaluated, and decisions made, in light of the family’s goals and objectives.

Recognizing the need for information usually means the manager is concerned about a particular problem. Problem recognition is not automatic. For example, low net farm income is often identified as the problem when in reality it is a symptom of another problem on the farm or ranch.

A wealth of information is available within and outside an existing farm or ranch business. Financial and production records—internal information—are among the best sources of information within the business and can serve as a tool for filtering information from outside the business—external information.

Internal Information

Farm records are documented evidence of experiences gained on the farm that generally contain more information than the manager realizes. Analyzing records over a number of years should help to identify problems in an existing business. The key is to spend time in reviewing, analyzing, and comparing actual performance with expected results. These documented experiences are also an excellent way to filter information. Attempting to explain differences between expected and documented results can pinpoint what information is needed to achieve given goals.

Unless a manager can identify ways the business will operate differently, a

year's outcome likely will be close to the previous year's. One role of management is to obtain and use new information to improve the likelihood of achieving desired results.

Over time, there is a temptation to become optimistic in recalling production rates and efficiency measures. Compare actual sales with perceived results. Have an optimistic outlook on life, but realistic expectations in the planning process. A major difficulty occurs in filtering information concerning new enterprises. Overestimating production and underestimating costs for unfamiliar enterprises are common.

External Information

In using records as a basis for developing plans for coming years, adjustments must be made for expected market, policy, and technological developments. This external information is often incomplete. However, anticipating changes puts the manager in a better position to capitalize on these changes. Primary sources of external information include the Cooperative Extension Service, other USDA agencies, farm organizations, other farmers, mass media, and agribusiness firms. Keys to filtering information from these sources include deciding what is important, previous reliability of the sources in providing relevant and accurate information, and what is to be gained or lost.

Farmers and ranchers historically have relied heavily upon observing the performance of other farmers as a way of filtering information. Common sense says to be cautious about a practice if no other farmers are using the practice in the area. Innovators stand to gain from early adoption of a practice, but they also have an increased risk of undesirable results.

Managers should not jump to conclusions about what makes a particular business successful. The appearance of success could come from another source of income off the farm or ranch, as well as another enterprise or production method within the business.

Time Management

One sign of a good manager is the ability to decide what is important, and to get dependable information with a minimum of effort. Some managers spend an excessive amount of time simply obtaining information.

A manager needs to be informed, but exercise care to avoid the trap of being a professional meeting attender and information seeker. Keep in mind your need for gathering information. Do not spend excessive time filtering information that is "nice to know." Focus on information useful in your current or prospective business. Characteristics of decisions to be made influence the amount of time and resources justified in gathering and analyzing information for a particular decision.

When To Decide

Knowing when to stop investigating and make the final decision is difficult. The risks incurred depend on characteristics of the decisions. Managers should compare the cost of collecting and filtering additional information against potential gains and losses. Acceptable levels of accuracy and the seriousness of an error will vary with individuals.

Individuals with a tendency to postpone decisions should realize that doing nothing is a decision to continue what they have been doing. This decision should be made consciously instead of just letting it happen. If information was

properly filtered and analyzed, better alternatives could be available. Not making a decision may be worse than making some poor decisions. However, making a conscious decision to not make a change or to postpone a decision can be the best decision.

Tips for Filtering Information

Here are some suggestions to help in filtering information and making better decisions:

1. Take time to think. Maintain a curiosity to learn. But do not waste time.

2. Identify major problems to be solved, opportunities for improvement, and the information needed for decisionmaking.

3. Sort out big decisions from little decisions. Concentrate your time on important decisions. This reduces the number of daily decisions.

4. Discuss major expenditures with the recordkeeper and other family members. Sometimes a mistake is made because one individual keeps the records and another person makes a major purchase without the benefit of record information. Realize the importance of what has gone on in the operation. Furthermore, project the consequences of a particular decision on the farm business. Purchase with a plan instead of on impulse.

5. Discuss major decisions with another knowledgeable individual, other than family members, who can be more neutral. Do not rely solely on your own judgment. Talking out a decision encourages the organization of pertinent information.

6. Evaluate alternative outcomes. Estimate what will happen to the operation and the family if the decision does not work, as well as if it does work. Combine an optimistic outlook on life with realistic expectations from deci-

sions. Leave some slack for adverse conditions.

7. Ask if the decision makes common sense. Ask questions, such as how many families can the farming operation realistically support?

8. Individuals starting new farms or enterprises should slow down and not get caught up in the excitement of buying and building. Before committing substantial resources to an unfamiliar endeavor, seriously consider working in an established operation for a minimum of 2 - 4 weeks. Sometimes the desire goes away and individuals can avoid substantial losses. It is generally too costly to simply try something. Commitment is needed for success.

9. Use farm planning tools such as record analysis, budgets, and whole farm planning to organize your thoughts and filter information needed for improved decisionmaking.

Learning Financial Management by Interactive Videodisc

"I'm sorry, but I can't give you the loan you're requesting until you show me that you're on top of your business." Frank Johnson was infuriated when his banker told him this. He just wanted to get his operating loan for the year and go run his farm as he always had.

The above scenario appears in the opening scene on the USDA's first interactive videodisc (IAV), "Cash-Flow Planning." The videodisc program is designed to teach farmers and ranchers how to develop, analyze, and use a cash-flow plan. This program offers the user an opportunity to interact with knowledgeable people: Frank and Florence Johnson, who have now been using cash-flow planning on their farm for 2 years; Carl, the Extension Agent, who taught them how to use cash-flow planning; and Bill, their banker, who motivated them to learn about cash-flow planning and then helped them along the way.

What Is It?

An interactive videodisc learning system consists of a microcomputer, a vide-

odisc player, a television, a printer, and the cables to connect them all. The computer controls the videodisc player. Each videodisc contains 54,000 frames of pictures and two sound tracks. But you don't have to understand how all this equipment works; you simply control the system by punching numbers into a keyboard.

The computer screen indicates the alternatives available to you. When you select one, such as fertilizer costs, the computer tells the videodisc player to play the segment on how to calculate fertilizer costs. At the end of the segment, the computer asks you a multiple choice question to see if you understand the lesson. Based on your answer, the computer either congratulates you for your correct answer or tells the videodisc player to give you additional information. Then you proceed to the next step.

Why Use Interactive Videodisc?

In a seminar or lecture on financial statements, farmers and ranchers might

Larry Bitney, Extension Farm Management Specialist, and Gail Blankenau, Project Manager, Interactive Videodisc, Department of Agricultural Economics, University of Nebraska, Lincoln, NE

hesitate to ask questions. Many people feel overwhelmed when asked to fill out a financial statement form, especially if their future depends on the answers. But in an interactive videodisc learning environment, where there is no such thing as a dumb question, you can ask the experts the same question over and over. Videodiscs have the patience of Job. They will keep you alert by asking you questions about each step. They will rephrase statements to make the information more understandable. They will work with you until you completely understand the process. They will allow you to repeat material. You can take as long as you need. If you get tired, you can walk away and come back whenever you feel like it.

There are many different types of agricultural operations, and interactive videodisc can deal with this situation. For example, during a lecture on cash-flow planning, a rancher may tune out during a long discussion of crop plans. But with the "Cash-Flow Planning" IAV, the rancher can skip the crop plan and spend most of his or her time on the livestock plan.

If you already know quite a bit about cash-flow planning, you can still benefit from a review of some of the finer points. Try matching wits with Bill the banker as he quizzes you about the cash-flow plan you present to him. Even if you are a seasoned financial manager, you might feel a bit apprehensive when Bill slides his chair back, clears his throat, and begins to tell you whether you get the loan or not.

Ideal for Farm and Ranch Managers

Farmers and ranchers are a particularly good audience for this technology. They have a no-nonsense approach to

learning, and they want learning to be directly applicable to their lives. They want to learn quickly, and the learning experience has to be enjoyable or they won't continue. In particular, farmers and ranchers like the physical activity, involvement, and hands-on experience that interactive videodiscs provide. To learn with this technology, a person must act, strike keys, and make decisions.

Furthermore, farm financial management programs are directly applicable to the lives of farmers and ranchers. After working with this program, they can go home with completed financial statements. On top of that, farmers and ranchers have fun learning with the cash-flow planning interactive videodisc, according to a study of the program by the Nebraska Cooperative Extension Service.

Farmers and ranchers are also concerned about confidentiality. With this program, they enter their financial information on a computer diskette that they take home with them.

Efficient Learning Method

Studies of the effectiveness of IAV instruction indicate that trainees using this method learn faster and retain more information than those using more traditional methods of instruction.

For example, a lecture group was compared to an IAV group learning the same material in a biology course at the University of Nebraska. Although the two groups had similar pretest scores, the IAV group scored higher than the lecture group on post-course and retention tests. In addition, the IAV group's average study time was 36 percent less than that of the lecture group.

Interactive videodiscs have many advantages over other instructional media

because this technology combines the capacities of a number of other methods. For example, it combines the stimulation of an audiovisual medium with the drills, repetition, and feedback that are available from computer-aided instruction. Color, voice, graphics, and motion video are combined through the power of a microcomputer.

The primary disadvantage is that interactive videodisc systems are too expensive for most farmers and ranchers to have in their homes or offices. The systems are usually located in places such as Extension Offices, banks, and schools, where many people can use them.

Farm Financial Management Series

The farm financial management series on IAV consists of three videodiscs: "Cash-Flow Planning," "Balance Sheet," and "Income Statement." They all have the features described previously in the discussion of the cash-flow planning-program. However, "Balance Sheet" and "Income Statement" have

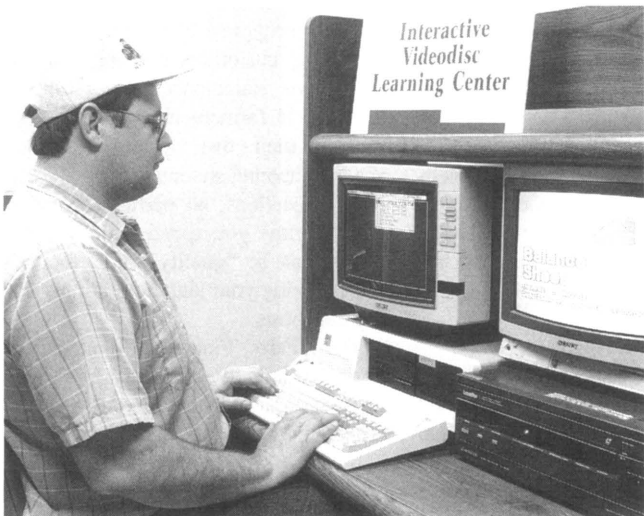
some added attractions. Based on feedback from participants in the cash-flow planning pilot project, the balance sheet and income statement IAVs allow more user control. Different learning sequences are used.

Paul Patterson, an Extension Farm Management Specialist in Idaho, said, "I gave 'Cash-Flow Planning' to one of my agents last week. He really liked it. I told him, 'Wait until you see 'Balance Sheet.'"

Balance Sheet

Have you ever gotten lost during a meeting? Everyone else seems to know what's going on. That's how John and Teri Whitlock feel during their annual co-op meeting when the manager discusses the balance sheet. John and Teri have decided they need to do their own balance sheet, and you can do yours with them. Frank is a farmer who knows about balance sheets, and he is coming over to help.

That scene is the introduction to the "Balance Sheet" interactive videodisc program. As the Whitlocks learn, you



Extension Specialist Steve Schulz operates the interactive videodisc microcomputer, with "Balance Sheet" software program developed at the University of Nebraska. (Photo by University of Nebraska)

learn. Once the balance sheet is completed, trainees need to know what it means. An investigative reporter, Wallace Blakeman, introduces the analysis section of the balance sheet videodisc. He interviews lenders, an Extension Agent, and a farmer to find out how and why they analyze their balance sheets.

If you have ever wondered what your lender is looking for, you can find out with this program. "What's your benchmark for the current ratio?" Blakeman asks. Banker Roy Hart responds, "Well, we're all different. I like to see a current ratio of 1.2 or higher if possible. It gives us a 20 percent cushion, based on their assets." (See Part IV, Chapter 3 for more information on how to obtain and use credit.)

While filling out your own balance sheet, you realize you have forgotten where to find a piece of information. Hit one key and the "Help" menu appears. You choose "Sources of Information" and look up the item you need. Press another key and the computer puts you back on the balance sheet. If you forget how to calculate accrued interest for a certain type of loan, press "Help" along with "Examples of Entries" and a sample entry appears. Print it and go back to that line of the loan schedule. Remember, help is just a key away with the "Balance Sheet" videodisc.

The balance sheet videodisc is "well-organized, fast, complete, and easy to read," said Larry and Tamara Neubauer, a farm couple from Bottineau, ND, after working with the program.

Income Statement

In the "Income Statement" videodisc, John and Teri Whitlock are back, and they want to know exactly how much they made last year—what they really made, not what their cash-basis income

tax return shows. So they go to see Jim, a successful farmer who does financial consulting.

As they take each step in the process of filling out the income statement, you go through the same process. There are lists of items to include or exclude on the television screen when you put in your numbers. The program has the same "Help" features as the "Balance Sheet" program.

Did you ever want to be an actor? Now, you have a role to play. You are the lender for the day. Your supervisor gives you the loan criteria. You talk with a farm couple. You analyze their cash-flow plan, their balance sheet trends, and their income statement trends. Then you decide. Your supervisor will let you know how you're doing.

Use by Lenders

In addition to field tests by Extension staff in several States, some bankers are experimenting with interactive videodisc learning programs. A bank interactive videodisc learning center was featured at the 1988 American Bankers Association's Agricultural Bankers Conference in Des Moines, IA.

These programs fit in with the trend of having customers prepare more of their own statements in agricultural lending. If farmers and ranchers can prepare their own accurate balance sheets, income statements, and cash-flow projections, all parties can benefit. The time you spend with the loan officer can be "quality time," focused on analyzing your situation, not on filling out forms.

The "Farm Financial Management Series" interactive videodisc programs may be ordered from the authors at the University of Nebraska-Lincoln.

Where To Go for Information

Information on farm and ranch management is available from a wide range of public and private sources.

Cooperative Extension System

A major supplier of such information is the Cooperative Extension System, which is affiliated with each of the Nation's land-grant universities and the U.S. Department of Agriculture in Washington, DC.

Each county has an Extension Service office that provides a direct link to the land-grant university. County Extension Agents can provide information on a wide range of topics, including farm and ranch management.

In addition, most States have Extension Specialists in farm and ranch management who can provide information on a multitude of topics, including crop and livestock budgets, financial planning and management, and computer software support. For specific information, write or phone the farm and ranch management Extension Specialist at the land-grant university in your State:

Alabama:

80 Extension Hall
Auburn University
Auburn, AL 36830

Alaska:

Cooperative Extension Service
University of Alaska
Fairbanks, AK 99775

Arizona:

Dept. of Agricultural Economics
University of Arizona
Tucson, AZ 85721

Arkansas:

Cooperative Extension Service
P. O. Box 391
Little Rock, AR 72203

California:

Dept. of Agricultural Economics
University of California
Davis, CA 95616

Colorado:

Dept. of Economics
Colorado State University
Fort Collins, CO 80521

Bill Braden, Communications Specialist, Texas Agricultural Extension Service, College Station, TX

Connecticut:

Dept. of Agricultural Economics
University of Connecticut
Storrs, CT 06268

Delaware:

232 Townsend Hall
Dept. of Agricultural Economics
University of Delaware
Newark, DE 19717

Florida:

Room 1157, McCarty Hall
University of Florida
Gainesville, FL 32611

Georgia:

Agricultural Economics Dept.
Coliseum
University of Georgia
Athens, GA 30602

Hawaii:

Dept. of Agricultural & Resource
Economics
875 Komohana Street
Hilo, HI 96720

Idaho:

Extension Economics
University of Idaho
776 Science Center Drive
Idaho Falls, ID 83402

Illinois:

Dept. of Agricultural Economics
University of Illinois
Urbana, IL 61801

Indiana:

Dept. of Agricultural Economics
Purdue University
West Lafayette, IN 47907

Iowa:

560 B East Hall
Iowa State University
Ames, IA 50011

Kansas:

Agricultural Economics Dept.
Kansas State University
Manhattan, KS 66506

Kentucky:

Dept. of Agricultural Economics
University of Kentucky
Lexington, KY 40506

Louisiana:

Cooperative Extension Service
Louisiana State University
Baton Rouge, LA 70803

Maine:

Dept. of Agricultural Economics
302 Winslow Hall
University of Maine
Orono, ME 04469

Maryland:

Dept. of Agricultural & Resource
Economics
Symons Hall
University of Maryland
College Park, MD 20742

Massachusetts:

Hampshire County Extension Office
15 Straw Avenue
North Hampton, MA 01060

Michigan:

Dept. of Agricultural Economics
Michigan State University
East Lansing, MI 48824-1039

Minnesota:

249 Classroom Office Bldg.
University of Minnesota
St. Paul, MN 55108

Mississippi:

Mississippi State University
P. O. Box 5446
Mississippi State, MS 39762

Missouri:

220 Mumford Hall
University of Missouri-Columbia
Columbia, MO 65211

Montana:

Dept. of Agricultural Economics
Montana State University
Bozeman, MT 49715

- Nebraska:
Dept. of Agricultural Economics
University of Nebraska
Lincoln, NE 68583
- Nevada:
Dept. of Agricultural Economics
University of Nevada-Reno
Reno, NV 89557
- New Hampshire:
Cooperative Extension Service
317 James Hall
University of New Hampshire
Durham, NH 03824
- New Jersey:
Dept. of Agricultural Economics &
Marketing
P. O. Box 231, Cook College
Rutgers University
New Brunswick, NJ 08903
- New Mexico:
Dept. of Agricultural Economics
New Mexico State University
Las Cruces, NM 88001
- New York:
Dept. of Agricultural Economics
Cornell University
442 Warren Hall
Ithaca, NY 14853
- North Carolina:
Cooperative Extension Service
Box 8109
North Carolina State University
Raleigh, NC 27659-8109
- North Dakota:
Cooperative Extension Service
North Dakota State University
Fargo, ND 58102
- Ohio:
Dept. of Agricultural Economics
Ohio State University
Columbus, OH 43210
- Oklahoma:
Dept. of Agricultural Economics
Oklahoma State University
Stillwater, OK 74074
- Oregon:
Dept. of Agricultural Economics
Oregon State University
Corvallis, OR 97331
- Pennsylvania:
Extension Economics
202 Armsby Building
Pennsylvania State University
University Park, PA 16802
- Puerto Rico:
Agricultural Extension Service
University of Puerto Rico
Rio Piedras, PR 00928
- Rhode Island:
Cooperative Extension Service
Woodward Hall
University of Rhode Island
Kingston, RI 02881
- South Carolina:
Dept. of Agricultural Economics
Clemson University
Clemson, SC 29631
- South Dakota:
Dept. of Economics
South Dakota State University
Brookings, SD 57007
- Tennessee:
Dept. of Agricultural Economics
University of Tennessee
P. O. Box 1071a
Knoxville, TN 37901
- Texas:
Dept. of Agricultural Economics
Texas A&M University
College Station, TX 77843-2124
- Utah:
Dept. of Agricultural Economics
Utah State University
Logan, UT 84321
- Vermont:
Dept. of Agricultural & Resource
Economics
University of Vermont
178 South Prospect
Burlington, VT 05401

Virginia:

Dept. of Agricultural Economics
Virginia Polytechnic Institute & State
University
Blacksburg, VA 24061

Washington:

Dept. of Agricultural Economics
Washington State University
Pullman, WA 99163

West Virginia:

2088 Agricultural Sciences Bldg.
West Virginia University
Morgantown, WV 26506-6108

Wisconsin:

Extension Farm Management
University of Wisconsin
427 Lorch Street
Madison, WI 53706

Wyoming:

P. O. Box 3354
University of Wyoming
Laramie, WY 82071

At the national level, contact:
Program Manager, Farm Management
Extension Service
Room 3340-S
U. S. Department of Agriculture
Washington, DC 20250

Libraries

Libraries at the universities mentioned above are well stocked with books and other publications on farm and ranch management. The USDA's National Agricultural Library is also an excellent source of information:

National Agricultural Library
10301 Baltimore Blvd.
Beltsville, MD 20705

Private-Sector Information Sources

Private sources of farm and ranch management information include:

American Society of Farm Managers
and Rural Appraisers, Inc.
950 South Cherry Street
Denver, CO 80222

Doane Information Services
11701 Borman Drive, Suite 100
St. Louis, MO 63146

Kiplinger Agricultural Letter
1729 H Street NW
Washington, DC 20006

On-Line Information Services

A number of on-line computer information services can help farm and ranch managers. They include:

ACRES
American Agricultural
Communications System
225 Touhy
Park Ridge, IL 60068

AgLine
Doane Information Services
11701 Borman Drive, Suite 100
St. Louis, MO 63146

Agribusiness U.S.A.
Pioneer Hybrid Data Base Mgt.
5608 Merle Hay Road
Johnston, IA 50131

AGRICOLA
National Agricultural Library
Information Systems Division
10301 Baltimore Blvd.
Beltsville, MD 20705

AgriData Network
330 E. Kilbourn
Milwaukee, WI 53202

AQS II

Commodity News Services, Inc.
P.O. Box 6053
Leawood, KS 66206

CompuServ/ComptServ
5000 Arlington Centre Blvd.
Columbus, OH 43220

Grassroots
Grassroots Information Services
550 Barry St.
Winnipeg, Manitoba R3H 0R9

Instant Update
Professional Farmers of America, Inc.
219 Parkade
Cedar Falls, IA 50613

Menu DIALOG Information Services
1520 S. College Ave.
Fort Collins, CO 80524

National Pesticide Information Retrieval
Entomology Hall, Purdue University
West Lafayette, IN 47907

National Weather Service
Climate Analysis Center
World Weather Bldg., Room 811
Washington, DC 20233

NewsNet
945 Haverford Road
Bryn Mawr, PA 19010

The Source
Source Telecomputing Corp.
P.O. Box 1305
McLean, VA 22102

USDA EDI Service/USDA Online
Room 536-A, Office of Information
U.S. Dept. of Agriculture
Washington, DC 20250

Publications

Agricultural periodicals can provide a wealth of management information. General farm publications to choose from include:

Ag Consultant
Meister Publishing Co.
37841 Euclid Ave.
Willoughby, OH 44094

AgData/Agricultural Computing
Doane Publishing Co.
11701 Borman Drive
St. Louis, MO 63146

Agrichemical Age/Agrichemical
Briefing
731 Market Street
San Francisco, CA 94103

Ag Technology News
1970 N. Haddam Place
Hoffman Estates, IL 60195

Agweek
113 N. Third Street
Grand Forks, ND 58206

Agri Finance/Agri Marketing
6201 Howard Street
Niles, IL 60648

Agri-Equipment & Chemical
111c S. Seventh Avenue
Yakima, WA 98907

Farm and Ranch Living
5400 S. 60th Street
Greendale, WI 53129

Farm and Home News
Monroeton, PA 18832

Farm Chemicals
37841 Euclid Avenue
Willoughby, OH 44094

Farm Equipment
1233 Janesville Avenue
Fort Atkinson, WI 53538

Farm Futures
330 E. Kilbourn Ave.
Milwaukee, WI 53202

Farm Industry News
1999 Shepard Road
St. Paul, MN 55116

Farm Journal
230 W. Washington Square
Philadelphia, PA 19105

Farm News
424 S. Adams Street
Marion, IN 46953

Farm Press Publications
Clarksdale, MS 38614

Farmer's Digest
Brookfield, WI 53008-0624

The Farmer's Exchange
19401 Industrial Drive
New Paris, IN 46553

Farmland News
3315 N. Oak Street Trafficway
Kansas City, MO 64116

The Food & Fiber Letter
P.O. Box 9153
Arlington, VA 22209

Hay and Forage Grower
1999 Shepard Road
St. Paul, MN 55116

Irrigation Journal
Van Nuys, CA 91409

The New Farm
222 Main Street
Emmaus, PA 18098

News and Farmer
Maple Avenue
Preston, MD 21655

Prairie Farmer
Decatur, IL 62525

Progressive Farmer
820 Shades Creek Pkwy.
Birmingham, AL 35209

Rural Enterprise
N80 W12878 Fond Du Lac Ave.
P. O. Box 878
Menomonee Falls, WI 53051

Successful Farming
17116 Locust Street
Des Moines, IA 50336

Top Producer
230 W. Washington Square
Philadelphia, PA 19105

Part VII

A black and white photograph of a man walking a dog on a path. The man is wearing a white t-shirt, dark shorts, a baseball cap, and sunglasses. He is walking towards the camera. The dog is in the foreground, partially visible. The background is a wooded area with trees and foliage. The image has a halftone or dithered texture.

Management Services:

Resources You Can Tap

Farm Lenders Offer Management Assistance

Farm management assistance and related credit counseling are frequently available through farm lenders and their agricultural loan officers. Three types of institutions—commercial banks, the Farm Credit System's borrower-owned banks and associations, and USDA's Farmers Home Administration (FmHA)—are the main lenders for farmers all across the country. These lenders provide capital and other resources to help America's farmers acquire land, facilities, machinery, and supplies.

Farm lenders have a keen interest in the management of farm businesses, since they must rely on income generated by those farms to repay their loans. To assure high quality loans, lenders must have reliable information about their farmer clients, and they must be able to evaluate the strengths and weaknesses of farm businesses. Farm business management is closely related to the credit decisions that lenders must make on a daily basis.

Farm lenders generally have loan officers who are trained and experienced in farm financial management, and many are experts in the field. Farm loan officers often assist farmer clients in analyzing farm records, developing and interpreting financial statements, and evaluating the impact of proposed changes in the operation.

Varying amounts and kinds of management assistance are available through each lender. Farm families must analyze their particular needs and situations and select the lender that will best meet those needs.

The following describes services offered by the three main institutional groups of farm lenders. Contact the appropriate lender to determine services and assistance that will best suit your needs.

Commercial Banks

There are approximately 14,000 commercial banks located throughout the United States that provide a wide vari-

William H. Briscoe, Director, Program Development Staff, Farmer Programs, Farmers Home Administration, USDA, Washington, DC, and Leslie S. Miller, Manager, Agricultural Finance Division, American Bankers Association, Washington, DC, and Jeffrey D. Oates, Manager-Public Affairs, Farm Credit Corporation of America, Denver, CO

ety of loans and other financial services to farmers, ranchers, agribusiness suppliers, rural businesses and residents, and their nonrural counterparts.

Credit Services. These banks play a significant role in farm production and farm real estate lending, and can supply other credit services such as FmHA guaranteed loans, consumer and business loans, auto and truck loans, home and home-equity loans, student loans, and credit card services. In addition, in late 1989, they will be a significant source for long-term, fixed interest rate loans through the Secondary Market for Farm Real Estate Loans, more commonly known as Farmer Mac.

The majority of this commercial bank agricultural credit is supplied by the Nation's farm banks. Farm banks are defined by the Federal Reserve Board as banks whose agricultural loans, as a percentage of total loans, exceed the unweighted average of the ratio of farm loans to total loans at all banks. This ratio currently stands at 15.99 percent, and there are 4,441 farm banks.

Commercial banks continue to be the largest suppliers of farm production (nonreal estate) loans. By the end of 1987, banks held approximately 44 percent of this market, up from 38 percent in 1980. These production loans are tailored to meet the exact credit needs of individual farmers. They may charge fixed or variable interest rates and may vary in term from 1 day to 10 years. These loans may be set up as a single advance loan, where all the funds are borrowed at one time at the beginning of the loan, or they may be structured to provide funds in multiple advances.

Commercial banks can also supply farmers with fixed or variable rate real estate loans for the purchase or refinancing of farm real estate.

Lease Services. Because it is not always prudent for a farmer to purchase all needed assets, some banks are now servicing these customers through leasing programs. These leasing programs allow the borrower to control the use of the asset, without heavily affecting the farm's balance sheet. These leasing programs can provide some tax benefits that may not be available to farmers who purchase the assets for use.

Farm Management Services. Commercial banks offer agency and trust farm management services for their farmer customers. Often, the agency services are carried out for farm owners who cannot actively manage their farms, or for farmers who need extra expertise in managing their farms. The trust farm management services are often supplied to farmers who wish to set up a trust to manage a farm that will be passed on to heirs who cannot actively manage a farm.

Other Bank Services. Commercial bankers can attend training offered by the American Bankers Association to help them provide improved farm financial analysis to their farm customers. Some banks provide this analysis to their farm borrowers at no charge, and others charge borrowers to cover the cost of providing the analysis.

Commercial banks also provide customers with farm recordkeeping services, usually for a fee. Another service some banks provide for a fee is commodity marketing services. With the farmer authorization, the bank can transfer funds through the Federal Reserve System to cover margin calls.

Commercial banks also have the ability to provide farmers with a wide variety of deposit services, including checking and savings accounts, as well as cash management accounts such as

money market accounts, NOW accounts, certificates of deposit, wire transfers of funds, and certified checks. All deposits of less than \$100,000 are Federally insured by the Federal Deposit Insurance Corporation.

Bank policies and products vary from bank to bank. To find out what services are available in your local bank, speak with the bank's customer services representative.

Farm Credit System

The Farm Credit System is a nationwide network of borrower-owned banks and associations that provide credit and financial services to farmers, ranchers, and their cooperatives. Others eligible to borrow from Farm Credit include rural home buyers, commercial fishermen, aquatic producers, timber operators, rural utility systems, and other businesses related to agriculture. The Farm Credit System is the largest single provider of credit to U.S. agriculture, with offices in every State and Puerto Rico.

Credit for Agricultural Producers, Rural Home Buyers, and Farm-Related Businesses. Production Credit Associations (PCA's) make short- and intermediate-term loans with maturities of up to 10 years for a variety of purposes, including operating expenses, equipment purchases, and capital improvements. Federal Land Bank Associations (FLBA's) make long-term loans, typically with maturities greater than 10 years, for farm real estate and rural home mortgages. FLBA's make loans as agents for the district Farm Credit Banks. Agricultural Credit Associations (ACA's) make loans of all types. An ACA is the result of a PCA and an FLBA merging into a single association.

In many parts of the country, PCA's and FLBA's operate under joint man-

agement and, therefore, are able to offer borrowers short-, intermediate-, and long-term loans. System associations are sometimes known by their trade name—Farm Credit Services or Farm Credit.

Farm Credit offers borrowers a variety of loan products, including the standard variable rate loan and a number of fixed and adjustable rate loans. Special loan programs for small loans are also available in most areas; these minimize paperwork and speed up processing of loans typically under \$50,000.

Products vary from one district to another to reflect regional differences in the marketplace. Each loan is tailored to meet the specific needs of the individual borrower. Every Farm Credit office sets its loan rates on the basis of three primary factors: (1) the local competition, (2) the costs associated with obtaining loan funds and servicing the loan, and (3) the risks associated with the loan. Regardless of the type of financing, interest is paid only on the amount used and only for the time it is used.

Credit for Agricultural Cooperatives and Rural Utility Systems. There are three Banks for Cooperatives in the Farm Credit System—CoBank, National Bank for Cooperatives, located in Denver, Colorado; the Springfield Bank for Cooperatives in Massachusetts; and the St. Paul Bank for Cooperatives in Minnesota. They offer credit services to agricultural cooperatives, as well as rural utility systems and other eligible entities throughout the United States.

Leasing Services. The Farm Credit System provides leasing services to eligible producers, cooperatives, and rural utility systems through the Farm Credit Leasing Services Corporation, headquartered in Minneapolis, MN. Leasing is available for 1 to 10 years on virtually every type of equipment used in

business, including farm equipment, on-road vehicles, office equipment, and computers. Farm Credit Leasing has representatives in six regional Farm Credit offices to provide direct service to producers and cooperatives.

Other Services. In many parts of the country, Farm Credit borrowers have access to other financial services, including credit life insurance, crop insurance, farm accounting and recordkeeping, tax preparation, real estate appraisals, estate planning, and farm business consulting. Some districts offer member-borrowers a program of investing in Farm Credit securities.

Services available vary from one district to another. For more information about these and other Farm Credit products and services, contact your district marketing office or the local farm credit office.

Farmers Home Administration

FmHA, a USDA agency, administers a variety of supervised credit programs across rural America. Agency supervision includes closely monitoring borrowers and counseling them in order to provide management assistance. The agency makes and guarantees farm loans for both ownership and operating purposes. Applicants for FmHA assistance must be unable to obtain other sources of financing on terms or conditions they can meet. Through its farm credit programs, FmHA seeks to provide the necessary financial and management assistance to enable its borrowers to return to private sources of credit as soon as possible.

For 54 years, FmHA has been concerned primarily with credit and counseling services that have supplemented resources of the private sector for building strong family farms. In 1989, the

agency provided assistance to over 200,000 farm families, with more than \$25 billion of outstanding FmHA farm debt.

Computer Assistance. FmHA completed a nationwide automation project in 1987 that made computerized farm management and financial planning available to all borrowers and applicants in each of its county offices. Once a farmer's data have been entered in the computer, FmHA's county supervisor can easily provide "what if" results for various combinations of inputs and prices, to help a farmer decide on the best farm plan. FmHA also utilizes a sophisticated computer program called DALR\$, short for debt and loan restructuring system, to evaluate various combinations of debt restructuring alternatives.

Each borrower family receives the amount of assistance in planning and farm and home operation that is necessary to accomplish the objectives of the loan. Planning with these families enables them to think through their operations and determine the adjustments, improvements, and key practices that should be carried out to assure a successful operation. Planning also provides a guide for the family in making the best use of their land, buildings, and other resources, and provides a basis for determining the probable income, expenses, and net returns from the proposed operations. It provides FmHA with the basis for making the loan and indicates whether or not the loan can be repaid from income. In appropriate cases, the family's major lenders are encouraged to participate in the planning process.

Key Management Practices. Each county supervisor has established a list of key farm management practices and key financial practices that may be in-

cluded as part of the farm and home plan. The amount of planning necessary with each family depends on their background, training, experience, and farm and home management ability. Their initiative, industry, available family labor, health, and any physical handicaps, as well as the desires of the family, are considered in developing a plan of operations.

Before helping the family develop a plan for their farm, the FmHA county supervisor visits the farm to inspect the fields, buildings, fences, equipment, livestock, and so forth. All borrower families are encouraged to keep and use appropriate farm, business, and family records that will enable them to periodically analyze and improve their operations, including their use of income and credit.

When necessary, the keeping of effective records may be made a condition of loan approval or loan continuance with certain families. Loan funds may be advanced for training in this aspect of farm management.

Analysis of Operations. FmHA periodically helps borrowers to analyze their operations. This analysis is the process by which families, with the assistance of the county supervisor, review and evaluate their production and financial management to determine whether they have made progress, to discover problems in their operations, and to arrive at corrective actions.

During this analysis, county supervisors will concentrate on the phases of the operation needing improvements. Some families will need an analysis of their complete operation, while others need an analysis of only their financial management or their production management.

Where to Obtain Assistance. FmHA has a credit system that reaches rural America from 46 State offices, over 250 district offices, and nearly 2,000 county offices. Service is provided in every rural county or parish in the 50 States, plus the Pacific Trust Territory, American Samoa, Guam, Puerto Rico, and the American Virgin Islands. FmHA's network of offices enables it to maintain a close, one-on-one relationship with its borrowers.

You may request information or apply for FmHA assistance at the local FmHA county office serving your area. If you are unable to determine which office serves your area, please write to the Administrator, FmHA, USDA, Washington, DC, 20250 for its location.

The Professional Farm Manager

With the technological and practical changes that have taken place in American agriculture during the 20th century, landowners have come to recognize the need for more technical expertise in managing farm operations. This development marked the establishment of farm management as a professional field.

And with the increasing transfer of farmland—through consolidation, inheritance, gifts, trusts, and other means—persons or entities having no interest, knowledge, or understanding of agriculture have found themselves with ownership or responsibility for farmland and have often sought the services of professional farm managers.

Nearly 40 percent of the farm and ranch land in the United States is owned by people whose chief occupation is not farming. Some of these owners live far from the farm or ranch, or are unable to participate actively in management for one reason or another. Professional farm and ranch management offers non-farming landowners expertise in producing and marketing the crops and livestock raised on their farms.

The Role of the Professional Manager

The professional farm or ranch manager devotes most of his or her time to managing the owner's farm business. Though there are associated responsibilities, such as consulting, property sales, and appraisals, the manager's primary responsibility is to manage a farm or several farms.

Professional farm managers must understand production economic principles and make judgments and decisions based on the facts. They must apply commonly accepted principles, guided by their experience and the client's objectives.

One of the primary responsibilities of the professional farm manager is to determine what owners want from the farm or ranch. Some owners are concerned mainly with preserving the family farmstead, while others seek the highest possible income. In most cases, the owner and professional manager agree on a mix of goals that include such objectives as increasing net returns, finding a capable tenant operator, maintaining or improving soil productivity,

The American Society of Farm Managers and Rural Appraisers,
Denver, CO

conserving soil, improving the appearance of the farm, and being a good neighbor and community member.

The Manager's Duties

A professional farm or ranch manager must be an educator, a psychologist, a public relations expert, an engineer, a soil scientist, an entomologist, an animal scientist, and a marketing specialist. Perhaps the three most important functions are as a consultant to the owner, a recordkeeper, and a farm supervisor.

Consultant. As a consultant, the professional manager helps the owner/client identify feasible objectives and develop a detailed and workable program to achieve those objectives. The manager may also assist in selecting a capable person to operate the farm on a day-to-day basis (usually through a lease agreement). (See Part IV, Chapter 7.)

The manager develops plans—along with cost estimates—for managing operating and investment capital, labor, crop production, soil treatment, drainage, livestock production, building improvements, and farm resource expansion. He or she often makes recommendations about the cropping systems, soil fertility programs, pesticide use, harvesting methods, and crop storage and marketing.

Other duties include assessing the insurance program and representing the owner in adjusting crop or improvement losses; providing information about Government programs that affect the farm and farm income; and providing information and help in tax planning and management.

Recordkeeper. The professional manager must prepare complete and accurate reports of current progress, operational results, and the condition of improvements and submit them to the

owner as often as requested or necessary.

Supervisor. As a supervisor, the professional manager oversees the marketing of all crops and livestock, collects rents, pays operating expenses, and provides the owner with current receipt and expense statements. The manager also supervises the purchase of materials and supplies such as seed and fertilizer, ensuring that the farm owner receives the best price available.

In some cases, the manager also oversees the planning, construction, maintenance, and repair of buildings, fences, irrigation systems, drainage, terraces, and other improvements. The manager may also supervise livestock production and marketing.

The manager may also represent the owner in such situations as public hearings and fenceline disputes which may affect the farm.

Manager-Owner Relationship

A professional farm manager may be employed by an individual, a group, a partnership, a corporation, or a trust. In most cases, the manager enters into a contract with the owner. Management fees vary depending on the type of farm, size or volume of business, degree of supervision required, and problems encountered. Fees may be based on a percentage of the owner's share of income, a flat annual charge, or time spent managing the farm.

In some cases, a professional manager devotes his or her time to the property of a single owner; in others, the manager provides services to a number of owners.

Farm Management Firms. There are firms that provide professional farm management services. In large firms, there is a greater degree of specialization.



Almost 40 percent of the farm and ranch land in the United States is owned by people whose chief occupation is not farming. These owners often look to professional farm managers to effectively utilize the land, labor, and capital resources. (USDA Photo by Eugene H. Alexander, TX-51314)

tion among the staff than there is in one- or two-person operations.

Farm Management as a Profession

During the early part of this century, the USDA and many midwestern colleges began offering courses in farm management. Today, most agricultural colleges offer a curriculum for people who want to become professional farm managers. Courses cover topics such as agricultural economics, soils, crops, engineering, animal science, entomology, and other basic agricultural subjects.

In 1919 a group of professional farm managers met to discuss establishing an organization that would offer a forum for exchanging ideas on farm management and promote professionalism in their field. In 1929, the American Society of Farm Managers and Rural Appraisers held its first meeting.

Today the society has State and regional chapters throughout the United States and Canada and represents some 4,500 professional farm and ranch man-

agers and rural real estate appraisers. The society sponsors courses, seminars, tours, and meetings to help members maintain and improve their farm management and real estate appraisal skills. The society also publishes a twice-yearly journal.

Accreditation. The society confers the titles of Accredited Farm Manager (AFM) and Accredited Rural Appraiser (ARA) to members who pass a comprehensive testing program conducted by the society's accreditation committee. Farm and ranch managers who belong to and are accredited by the society must comply with stringent standards of professional practice and a code of ethics. They must each have at least 5 years of experience as professional managers, plus required continuing education programs of the society.

For information about the society and its accrediting and membership programs or about accredited member referrals, write or call the American Society of Farm Managers and Rural Appraisers, Inc., 950 South Cherry Street, Suite 106, Denver, CO 80222.

How Extension Education Programs Help Farm Managers

The Cooperative Extension System has a long history of offering educational programs about farm management. In the early days of Extension education, the business management course offerings far outdistanced the participation rate by farmers. The programs on production technology—how to grow the crop or how to produce the livestock—had more appeal than programs about the economic consequences of production decisions. However, this attitude seems to be changing as farmers express more interest in the business side of farming.

To be effective, a farm manager must match enterprises with available resources, analyze the economic realities of management decisions, and avoid getting caught up in the emotion of the moment. Although the land, labor, capital, and management needs are different for each farm, the principles of farm management are applicable to farms of all sizes.

How We Got Here

Extension farm management education started soon after World War II, with programs that focused on recordkeeping in the farm business. At that time, the mechanics of merely keeping track of farm income and expenses was the main concern. Business analysis was not emphasized. As time went on, these recordkeeping programs became more complete, integrating both the farm and the household records.

These programs had many titles. A common title used in the 1950's was "Farm and Home Development Programs." They stressed budgeting for the farm business, including enterprise budgeting, as well as partial and whole-farm budgeting. Family needs and family budgeting were also emphasized, as was the importance of a spending plan for both farm and family. (See Part III, Chapters 5-7 for more information on budgeting.)

Daniel B. Smith, Extension Agricultural Economist, Clemson University
Clemson, SC, and

Charles L. Moore, Sr., Extension Economist in Charge, Department of
Economics and Business, North Carolina State University, Raleigh, NC

A New Look

These farm and family planning activities assumed a new look as U.S. agriculture became more complex. By the early 1960's there was widespread use of computer technology in budgeting, farm planning, and record analysis. Computer programs became popular planning tools used by Farm Management Extension educators during this period.

Other programs have been developed and delivered by Extension educators to meet producers' business management needs in areas such as leasing arrangements, analyzing machinery investments, managing labor, income tax management, estate planning, and intergenerational transfer decisions. More recently, programs addressing business analysis, financial decisions, debt structure, and competitiveness in the global economy have been added.

A fundamental premise underlying the concept of farm management is that for farmers to achieve the most income from their farm businesses and for them to survive and remain competitive, they must allocate resources properly.

Meeting Differing Needs

Targeting a wide range of audiences and users of Extension programs is essential if the Extension System is to meet the educational needs of today's farm managers. These needs vary depending on the size of operation, mix of enterprises, type of farming, region, and amount of time devoted to farming—as opposed to nonfarm activities. We will discuss the challenge of meeting today's needs in Extension farm management education for small and part-time farmers and for commercial farmers.

Small and Part-Time Farmers. The largest group of farmers in this country

operate small farms. Some are full-time farmers, but many are part-time farmers with off-farm jobs that provide the major source of family income. The small family farm is still an important part of American agriculture, and there are Extension farm management programs designed specifically for small and part-time farmers.

Assistance is provided to help small farmers select the enterprise or combination of enterprises that will return the most profit to land, labor, capital, and management. Small farmers often focus on enterprises such as vegetables and fruits that have the potential for higher net returns per acre than such crops as corn or soybeans. Poultry and other livestock enterprises may also be especially adaptable to small farms. The management process must include not only production plans but financial and marketing plans also. It can be tragic for a small farmer to have vegetables or other commodities ready to harvest and nowhere to market them. (See Part II, Chapter 8 on alternative enterprises and Part IV, Chapter 8 on managing small-scale farms.)

Many States have Extension Agents who work primarily with small and part-time farmers. Farm management specialists help the agents conduct workshops on financial management, recordkeeping, and farm planning—all designed for small farmers. For more information on farm management programs available to small and part-time farmers, contact your County Extension Office.

Commercial Farmers. Commercial agriculture is a highly sophisticated business which requires the application of sound economic and business principles. The Nation's largest farms have multimillion dollar investments and gross incomes. Small and medium-size



Farm management specialists and County Extension Agents are available in every State to assist you with a variety of farm management needs. (USDA Photo by Larry Rana, 89BW1035-11)

commercial farms will have annual gross incomes ranging from \$200,000 to \$1 million. The Cooperative Extension System, through the land-grant universities, has the responsibility and challenge to provide educational programs in farm management to commercial farmers, professional farm managers, and agricultural lenders in each State.

Extension farm management programs are tailored to the needs of commercial producers and agricultural lenders in each State. These programs are offered through County Extension Offices as short courses or workshops consisting of 9-12 hours of instruction. Some universities offer short courses on campus for farmers, managers, and agricultural lenders. These courses can range from the basics of understanding enterprise budgeting to using computer models for long-range strategic planning. The objective of these workshops is to help farmers apply farm business

management principles that will improve net farm income to support a better quality of life.

Our Nation has a diverse agriculture. The need for educational information by the specialized fruit producers on the West Coast is different from the that of the corn and soybean producers in the Midwest or the diversified crop and livestock producers in the South. But each has a need for information on agricultural finance, risk management, farm planning, and farm business analysis. All of this planning analysis and management assistance must be based on accurate and complete farm business records to be of help to an individual producer.

Computers

Farmers are finding the microcomputer to be a useful investment for management purposes. Microcomputers are being used extensively to help farmers

organize data and information for decisionmaking. The Extension System can provide a wealth of computer decision aids for farmers, and excellent computer programs for a broad range of management needs are also available in the private sector. (See Part III, Chapters 8-9 for more information on computers and decisionmaking.)

Program Delivery

There are many ways that Extension farm management programs are delivered to those involved in commercial agriculture. Many States have farm management associations, an effective way to reach commercial farmers with farm business analysis programs. (See Part VII, Chapter 5 for more information on farm management associations.) Specially trained area farm management agents are available in many States to work with farmers and agricultural lenders. Some States now have County or Area Extension Agents who are well trained in farm management.

Marketing

The farm planning process is not complete unless it includes a marketing plan. There are many marketing alternatives that can help increase net farm income and reduce risks. Education programs on marketing are offered by the Extension System. Several private firms offer excellent market information and consulting services. The 1988 Yearbook, *Marketing U.S. Agriculture*, is another source of information.

Environmental Concerns

Managing agricultural production to ensure a safe food supply and quality environment is a top priority. Conservation practices, integrated pest management, and low-input sustainable agriculture are production alternatives and

systems that can contribute to sustaining our Nation's natural resources and environment. (See Part V for more information on farming and the environment.)

Farmers face the challenge of evaluating the economic consequences and profitability of these alternative systems of production. Farm management research and Extension education programs can help farmers identify the production systems, such as low-input sustainable agriculture, that offer profitable alternatives to conventional systems. Given the environmental constraints and farmers' desire to ensure a quality environment, it has become increasingly important that farmers make sound business management decisions. Extension farm management programs address environmental constraints and concerns in the planning process.

Keep Learning

The Cooperative Extension System remains a leader in farm management education. Farm management specialists and County Extension Agents are available in your State to assist you with your farm management needs. This assistance is available through the County or Area Extension Office.

A Day in the Life of a District Farm Management Agent

What happens during a typical day for a District Extension Farm Management Agent? It is nearly impossible to respond to that question. The planning process, educational activities, indepth workshops, clientele involvement, university commitments, program organization and management, professional development, and County Extension Agent requests occur regularly during the course of a year. The description of one day's activities would give only a partial picture of the scope and depth of the District Extension Farm Management program—a program where an Extension Agent with expertise in farm management serves a district or area including several counties.

The account that follows is an overview of one day in the life of a Michigan District Extension Farm Management Agent who serves nine counties in southwest Michigan.

5:25 a.m. Alarm clock rings. A new day dawns.

5:50 a.m. Listen to farm news, market news, and prices on the radio.

6:00 a.m. Participate in "High Energy Aerobics" at the "Y."

7:00 a.m. Leave for office. Dictate letters, instructions for secretary, and monthly narrative en route. Examples:

- Dictate letter to a farm family as a followup to an indepth Cooperative Extension Service Extension Management Team farm visit about financial analysis and strategic planning. Chaired the team comprised of an Extension Home Economist, County Extension Agent, and district fruit agent.

- Dictate letter to a farmer describing contents of a fact sheet that answers his questions about estate planning.

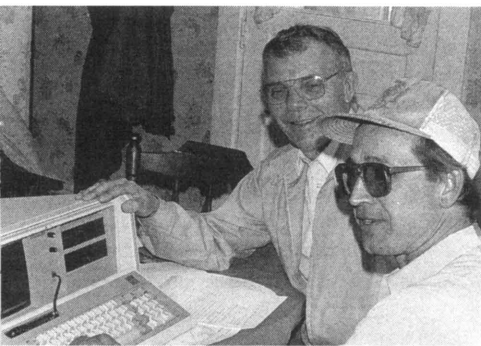
- Dictate letter to agents about presentations at a State district farm management agent/specialist meeting.

7:50 a.m. Pick up messages from preceding day. Return calls to agents and farmers. Examples:

- Return call to a farmer with an income tax question about proper reporting to IRS about PIK and Roll, Government program payments, and conservation expenses.

- Return a call from an Extension Agent requesting assistance with an educational program on farm business transfer.

W. Conard Search, District Extension Farm Management Agent, Michigan State University, Paw Paw, MI



Using the Extension Service portable microcomputer on location, Conard (Bud) Search (l) works up a gross margin analysis for the cash crop farm of St. Joseph County, MI, farmer Ray Gentz. (Michigan State University Photo)

- Return a call from a County Extension Director who asked for help with planning an advisory group meeting.

- Return a call from a hog farmer who produces over 9,000 market hogs each year. He asked for assistance evaluating expected changes in costs and returns for an investment in a manure handling facility to meet water quality standards. An appointment was set to meet at his farm with the area Swine Extension Agent and take the portable computer with capital investment software.

8:30 a.m. Give tapes to secretary. Leave office to attend Telfarm Business Analysis and New Telfarmer meeting (Telfarm is an educational program about computer farm records for management offered by the Michigan State University Cooperative Extension Service). Over 325 southwest Michigan farmers annually enroll in the project. There are about 1,100 participants statewide.

9:15 a.m. Arrive at meeting.

Meeting was planned by the County Extension Agents in the area and the district farm management agent to train

new Telfarm enrollees in the Telfarm system and to train experienced Telfarmers to interpret and use the financial statements and Comparative Business Analysis reports prepared by Telfarm. This meeting was the result of suggestions made by Telfarmers at Telfarm Advisory Group and Telfarm Check-In meetings. The guest speakers were a farm management specialist from campus, the district farm management agent, and Telfarm staff members. The group was split into two groups, with the new Telfarmers meeting with the County Extension Agent and Telfarm staff members. The experienced Telfarmers met with the district farm management agent, a farm management specialist, and the director of the Telfarm project.

This type of meeting receives high marks from the new Telfarmers who have the opportunity to meet the people they have talked with on the phone. The new Telfarmers learn how to properly enter their records into the system.

Experienced Telfarmers are delighted with the meeting since they learn how to use the income statement, balance sheets, statement of change in financial position, business analysis, and monthly cash-flow reports in their businesses. Extension Agents find these Telfarmer training events very useful in their own professional development and place a high priority on participation. The planning team makes certain that each part of the program is designed to meet the farmers' needs. The district farm management agent took responsibility to provide the resources to produce the learning. A portable computer, computer projector, overhead projector, and videotape were used in the presentations. A special invitation was made to key agricultural leaders who arrived about 11:15 a.m. to observe the activi-

ties prior to an "Agricultural Interface Meeting" with County Extension Directors, State Cooperative Extension Service Administrators, and District Extension Agents.

NOON. Lunch with agricultural leaders.

This group had two representatives from each county and included farmers, farm organization leaders, agricultural lenders, county commissioners, and a legislator. The district farm management agent's 5-minute presentation explained the long-range financial planning workshops, "Dealing with the Drought," sponsored by each county of the district.

The 1988 Drought

In the spring of 1988, agents in southwestern Michigan determined that farmers wanted to learn how to evaluate the consequences of major adjustments in their farming operations. An inservice training event was scheduled to teach Whole Farm Planning to agents. A similar training event was held for key agricultural lenders. The University of Minnesota FINPACK software package was used for this training, which emphasized the use of FINLRB—Financial Long-Range Budgeting. (See Part III, Chapter 8 on FINPACK.)

The worst drought in memory hit. Congress responded with a disaster program, and the State Legislature appropriated special monies to the Cooperative Extension Service. Ten portable computers, loaded with the FINPACK software, and a graduate student travelled around the State providing technical assistance with the workshops. Each office participating in the training was given a copy of the software. A workshop was designed to train farmers in the evaluation of alternative plans. A 2-day workshop was held in six lo-

cations around the district. Over 60 farmers, representing every county, participated, and 12 Extension Agents assisted with the training. The farmers represented a cross-section of agriculture—commercial cash crop, fruit, vegetable, swine, dairy, beef feeding, and apiary operations. The participants' evaluations indicated the workshops were quite valuable in financial analysis.

2:00 p.m. Meeting with County Extension Agents to start work on next year's plan of work in farm management.

Results of the evaluations of workshops, meetings, software offerings, Extension Management Assistant Team farm visits, and videotape offerings were discussed along with suggestions from advisory groups. A challenging new year in farm management was being designed. Ideas from this meeting were fed by participating agents into the State Agricultural Industry Committee meetings and farm management district agent and specialist meetings.

5:00 p.m. Meeting adjourns.

Stop by office on way home to gather materials for upcoming program at Farmer's Day. The titles are "The Land Investment—How Will It Pay? Can I Afford It?" and "Making Tough Decisions with Machinery—Should I Own, Lease, or Custom Hire?" A note attached to the material said, "Take your portable computer, computer projector, screen, and 'Business Management In Agriculture' videotapes."

6:00 p.m. Arrive home.

7:30 p.m. A young farmer calls and wonders if he should invest in an IRA, buy mutual bonds, or reduce his debt.

He argues that if he pays down his debt he will have more tax to pay. A very interesting discussion followed. He was a participant in the "Dealing With

Drought—Financial Long-Range Budgeting” workshop.

As the day draws to a close, the District Extension Farm Management Agent thinks about the productive time the 22 fruit growers, their County Extension Fruit Agent, the District Extension Fruit Agent, and he had at the training program they offered for growers contemplating the purchase of a computer.

Working Toward a Goal

A typical day simply does not exist for a District Extension Farm Management Agent unless we consider that the overall program objective of the Cooperative Extension Service is to plan, execute, and evaluate learning experiences that will help people acquire the understanding, abilities, attitudes, and skills essential for solving farm, home, and community problems. All of the District Extension Farm Management Agent’s time is spent each day working toward this objective.

District Extension Farm Management Agents spend a great deal of time lead-

ing educational programs. Four day-long workshops on topics like “Who Will Be Farming in the 21st Century?,” “Business Management in Agriculture,” “Take the Competitive Edge—Greenhouse Strategic Planning,” “Using the Computer on Your Christmas Tree Farm,” and “Reaching for Results” are not uncommon. In those cases, the entire day is spent in the workshop. On days when it is necessary to meet with specialists about material development, program planning, or inservice training, an entire day is consumed, because a 6-hour meeting plus a 5-hour round trip drive take all of the available time.



Conard (Bud) Search (l) participates in a 1989-90 multicounty farm management planning session with (l to r) Bill Minner, Jackson County Extension Director; Ray Fast, Branch County Extension Director; Bill Plummer, Calhoun County Extension Director; and Natalie Rector, Multicounty Extension Agricultural Agent. (Michigan State University Photo)



Conard (Bud) Search, District Extension Farm Management Agent, (r) and Berrien County Extension Agent Joanne Davidhizer (l) visit with three generations of the Streffling farm family—Warren, Paul, and Matt Streffling. (Michigan State University Photo)

Farm Business Management Associations Provide Decisionmaking Help

Today, more than ever, farmers need sound help with management decisions. They also need access to financial data retrieval systems that provide information required for farm decisionmaking. They can obtain this assistance at a relatively small cost by joining a farm business management association.

Many States have these associations, and farmers who participate in them report that they receive valuable benefits from association membership. In Illinois, where the first formal association was organized in 1924, there are now over 7,000 members of farm business management associations.

Strength in Numbers

A farm business management association is a group of farmers who organize into a small cooperative and assess themselves fees to secure the services of a farm management specialist (sometimes called a fieldman because of the large amount of time spent in on-farm visits with association members).

The farm management specialist assists them in gaining greater control over their farm businesses and a better understanding of their businesses through objective analysis. This is usually the first step toward taking actions to increase profitability.

The associations' major functions include helping members to make major management decisions and use appropriate technologies to make successful decisions and increase farm profits. In the process, the farmer increases his or her business management skills.

In most cases, associations are organized as nonprofit corporations in conjunction with the Cooperative Extension Services of State land-grant universities. Farm members control each association and elect a board of directors to carry out association policies, develop budgets, and establish and collect membership fees. State Extension Services often help associations get started, organize, and secure start-up funds. Once an association is securely established, membership fees usually

George J. Young, Associate Professor and Extension Economist-Farm Business Management, Auburn University, Auburn, AL, and Buel F. Lanpher, Program Leader-Farm Management, Extension Service, USDA

cover a large share of operating costs. However, the Extension Service often continues to provide limited funding.

The relationship between associations and State Extension Services benefits the entire farming community by providing valuable farm record data for use in Extension programs and agricultural education and research. Association members often make valuable contributions to other Extension and research programs by assuming leadership roles in these programs and participating in demonstration farm activities.

Recordkeeping

One of the most important benefits of belonging to a farm business management association is the help members receive in keeping complete, accurate production and financial records. Members are encouraged to keep records for the entire business, not just those needed for tax purposes. Farm records may be kept in a handwritten record book, an on-farm computer, or an association-owned computer.

The records cover cash income and expenses as well as inventory data on the quantity and value of feed, crops, and livestock at the beginning and end of each year. The records also include an inventory and utilization record of all farmland (owned and rented); crop production records; livestock birth and death records; and numbers and weights sold, purchased, and consumed.

Balance sheets are prepared to account for all inventory, purchases, sales, production, and on-farm uses. Asset values and liabilities are recorded, as well as accounts payable, accounts receivable, and prepaid expenses. (See Part III, Chapter 1 on recordkeeping.)

Cash-Flow Analysis

Once all monthly transactions are recorded, the farmer can generate reports using written records or, if available, a computer. The farmer compares the actual cash-flow of income and expenses with the projected cash-flow. Cash-flow analysis is a basic management tool that is taught and monitored by the association's farm management specialist. At year's end, the detailed records are summarized, and both individual and comparative analysis reports are prepared. (See Part III, Chapters 3-7 on budgeting, accounting, and financial analysis.) These reports are particularly helpful in:

- Measuring the performance of the farm business,
- Comparing the performance of one farm with that of similar farm businesses,
- Determining what can be done to improve the future performance of the farm business.

Although data from individual farms are confidential, association members pool information from their farms with that of similar farms to generate comparative reports. The comparative reports usually include:

- Accrual basis profit/loss statements,
- Sources and uses of funds statements,
- Beginning and end-of-year net-worth statements,
- Financial ratios and changes in net worth reconciled to the profit/loss statement,
- Calculations on returns to unpaid family and operator labor, interest earned on equity capital, and management returns,

- Rate earned on the farm investment.

Other reports cover information on individual farms' crop and livestock enterprises, including costs and returns per unit of production and a wide range of enterprise efficiency factors.

The individual and comparative reports provide a data base for assessing the farm's current financial status and identifying the farm's strengths and weaknesses.

The farm management specialist assists each farmer in preparing cash-flow budgets and projecting the impact of decisions concerning liquidity, solvency, net worth, and profitability. For tax purposes, farm records are used to prepare cash or accrual basis Schedule F's, detailed depreciation schedules, depreciation schedule summaries, investment credit recapture forms, Form 4797's, Schedule SE's, and so forth.

Farm Management Specialist's Role

The farm management specialist plays a key role in the functioning of the association and in assisting individual members. The specialist, who is professionally trained and experienced in farm management, meets with each member four to six times a year and holds additional conferences if special needs arise. The specialist reviews the farm's business records for completeness and accuracy during each meeting.

The specialist's most important contribution is helping the farmer use those records to assess the farm's current status in relation to past performance and helping the farmer plan for the future. The specialist does not make decisions for the farmer, but he or she helps the farmer see the situation more clearly and explore the likely consequences of available alternatives.

Microcomputers. In recent years, specialists have made extensive use of microcomputers to explore the many "what if" questions that farmers have; for example, what would be the impact of investing in new machinery or livestock. Individual farm business records and documented efficiency measures are helpful in analyzing the "what if" questions. (See Part III, Chapters 2, 8, 9, and 12 on using computers in farm management.)

Assessing Strengths and Weaknesses. Association members can discuss their management opportunities and problems in a confidential manner with an experienced person who understands their situations. Working with the farm management specialist, farmers discover their strong and weak points and learn how to build on their strengths and eliminate or minimize their weaknesses. For example, the specialist may use the individual and comparative reports to help a farmer recognize that the farm's machinery costs are too high and to implement corrective actions.

Road Map

Participating in a farm management association is like using a road map. The farmer sees where his or her business stands, determines the farm's short- and long-term destination, and develops routes or strategies for reaching the destination. By monitoring the business on a regular basis, the farmer can see if detours are needed. The issues tend to be similar from farm to farm, but the solutions are different for each farm—because each has different land, labor, capital, and management resources.

The following is a list of some of the management functions for which farm management specialists can provide assistance:

- Establishing farm and family goals,
- Deciding what to produce, and where and when to produce it,
- Deciding production methods and use of inputs,
- Determining land use based on productivity potential, fertility levels, tillage practices, conservation needs, regulations, and other constraints,
- Making decisions about machinery and buildings based on available labor and capital requirements (this includes decisions about whether to purchase as opposed to renting, leasing, or hiring—and from whom—as well as financing issues),
- Deciding on scale of production based on the farm's internal cost and return structure, the degree of diversification, and management capabilities,
- Making marketing decisions that involve the open market, contracting, hedging, options, selling direct to buyer or end user, delivery points, quality of product, and degree of integration,
- Forecasting future prices for farm products and inputs,
- Making financial management decisions involving acquisition of funds, quantity, terms, sources, equity-liquidity positions, repayment ability, time horizons, cash-flows, profitability of alternatives, and forecasting future financial needs due to depreciation of assets, expansion or contraction, and changing technology,
- Keeping production and business records by enterprise and ownership unit as a data base for decisionmaking,
- Preparing financial statements, business analysis reports, depreciation schedules, and employment tax records;

and managing income taxes, alternative minimum taxes, and other taxes.

Your County Extension Agent or State Extension Farm Management Specialist can help you become involved with the association in your area. If there is no association nearby, the Extension Service can help you and other area farmers start one.

Starting a Farm Business Management Association

Starting an association is a large undertaking, but the payoff is worth the effort. The following guidelines for starting an association are based on the experiences of four States that began associations in the 1980's: Alabama (1981) and three States that followed in its footsteps—New Mexico (1984), South Carolina (1987), and Georgia (1989). This approach has five basic elements:

- A core group of 25-35 progressive, innovative farmers who are committed to recruiting other members; an association can serve 50-70 participants for each farm management specialist employed.
- Supportive County Extension Agents who are willing to help the farmers establish an association. Extension Agents must participate in informational meetings, produce media releases, and, most important, make one-on-one contact with potential members. The agents play a vital role in establishing the associations because they know the farmers in their counties and can help identify leaders. They assist in selecting an informal steering committee to work with the State Extension Farm Management Specialists to promote the association and enroll charter members.
- State Extension Farm Management Specialists who understand how asso-

ciations can benefit farmers and the State's land-grant university. The specialists provide leadership to the steering committees and communicate with Extension and university administrators.

- State Extension and university administrators who are committed to helping the association during its formative years.

- Experienced farm management specialists who can help an association start operating effectively within a short time.

Membership Fees. As farmers are enrolled for the first year of operation, it is necessary to obtain a deposit that is applied towards the first year's fees. After charter members are enrolled (30 is a good number for the first year), the members formally organize themselves, elect a board of directors, and begin to operate as an association. Ideally, they hire an experienced farm management specialist during the enrollment period to assist in matters such as the budget, fee schedule, incorporation, and tax-exempt status.

Once the association is formally organized, the officers may approve a memorandum of agreement with the State Extension Service. The Extension Service agrees to provide substantial support during the association's formative years and limited support in the future, and to maintain the confidentiality of individual farm records. The association commits itself to enroll members without discrimination, assess and collect fees, provide funds to the Extension Service to pay the farm management specialist, and provide farm record data to the Extension Service.

Association Benefits

A 1988 report by the University of Missouri and Lincoln University found that 87 percent of farm business management association members said that they had become better managers because of their participation in association activities. More than 90 percent said their financial situation had improved as a result of association programs. Farmers felt that the association program has been particularly valuable in helping them deal with the financial problems of farming in the 1980's.

Management Needs of Small-Scale Agriculture

The only thing homogeneous about small-scale farms are the words “small-scale farms.” America’s small farms—those farms that generate \$40,000 or less of agricultural sales each year—constitute about 75 percent of the 2.2 million total U.S. farms. Small farms are found throughout America, from Maine to Texas, from the Atlantic to the Pacific, and in both rural and urban settings. They engage in a variety of enterprises—apples to zucchini to swine and a host of enterprises in between. Their owners must manage all aspects of the small farm business. Being small makes it critical for good management to prevail. Small-scale farm operators cannot survive mistakes. Too frequently, one mistake can prove fatal to the small business.

The management needs of small-scale agricultural enterprises are significant, perhaps greater than those of larger farms. Good management decisions are necessary for small-scale agriculture to succeed. Small-scale farms need support from all levels—national, regional, and local. The needs change constantly and new information must be made available.

Small-acreage enterprises are management-intensive. While the usual constraints of money and labor apply to small farms the same as they do to large enterprises, small farms face an additional problem: time management. Since 70 percent of all small farms are run as part-time operations, efficient allocation of time becomes crucial.

A properly managed small-scale farm is comparable to a smooth running engine. A skilled person must properly adjust the fuel mixture, the timing, and the idle speed for smooth, efficient operation. To be successful, the small farm manager must tune up three aspects of the farm business—marketing, capital/finance, and appropriate technology. Managers of small-scale farms often experience great difficulty in properly managing these three problems to achieve a smooth running small-scale farm. They need information from all sources to help them manage their enterprises.

Small-scale farmers frequently farm part-time; the size of farms and locations are very diverse; and almost all suffer from serious limitations on one or more resource. Add to this list grow-

Howard W. (Bud) Kerr, Jr., Director, Office for Small-Scale Agriculture, Cooperative State Research Service, USDA, Washington, DC



Success in the marketplace for small-scale agricultural entrepreneurs requires marketing skill, use of appropriate technology systems, and skill in handling capital and finance. (USDA Photo by Ron Sutton)

ing concerns about the environment, conservation, global issues, right to farm, the political action process, and a fickle consumer. Indeed, to succeed in small farming is a constant challenge in 1989. The key is management—proper management of assets and options of the small-scale farm operator. This particular segment of agriculture needs a focused national approach to resolve the identified problems now facing small-scale farmers throughout America and to better understand regional and local issues.

Viewed from a national perspective, the management needs of small-scale agricultural entrepreneurs are numerous and they must address diverse problems. The need is compounded because different regions, States, and even counties present different situations, including climates, soils, population densities, and tax rates. However, all problems and needs must be addressed for people living on small farms to maintain a competitive economic status, to continue to contribute to the recovery of

agriculture, and to give social strength to rural America. Also, there is increasing awareness that small-scale farmers make significant contributions to both the agribusiness and consumer industries of rural communities.

The Federal Response

In December 1986, an Office for Small-Scale Agriculture (OSSA) was created at USDA to improve the flow of information about small-scale farming to agricultural producers and to consumers. The office helps coordinate USDA Agencies and helps them direct research and educational programs of interest to small-scale farms. A lack of know-how can prevent small-scale farmers from succeeding, so disseminating useful information is crucial.

OSSA was created to identify the expertise of various systems and to gather and disseminate information to maximize the potential effectiveness of small-scale entrepreneurs. The purpose is to improve management—both on farms and at USDA.

OSSA has the following six initiatives to help small-scale farm operators with some of their management decisions:

1. A series of fact sheets entitled *A Small-Scale Alternative* help people who are interested in alternative crops and livestock for small-scale farms. The first 10 fact sheets in the series are on mushrooms, herbs, specialty vegetables, wildflowers, foliage plants, dessert vines, goats, sheep, exotic livestock, and exotic fruits. Several others are in various stages of completion.
2. A quarterly newsletter, *Small-Scale Agriculture Today*, provides information on small-scale agriculture with a focus on relevant topics, technology, and events. The newsletter gives small-scale

farmers access to information from such sources as growers, Extension Agents, soil conservationists, and university researchers, as well as the wealth of material available through USDA. The newsletter is short—four pages. Topics are condensed down to a few sentences, with directions on how to receive more information.

3. A small-scale agriculture directory was compiled and distributed by OSSA in the spring of 1989. About 500 Federal and State experts on small-scale agriculture or small farms are listed, with their addresses, telephone numbers, and three specific areas of expertise, such as market development, greenhouse culture, blueberries, or sheep. This listing of researchers and educators was distributed to public libraries, as well as Federal and State institutions that must address small-scale agricultural needs and is also for sale from the Government Printing Office. It is a management tool that enables improved networking.

4. A video on small-scale agriculture, "The Perfect Tomato, The Ideal Blackberry: Making Money in Small-Scale Agriculture," demonstrates that there is great potential for farmers who can diversify. However, many farm families are confused or bewildered by the term "diversify" and experience difficulty in selecting an alternative enterprise. This 9-minute video is aimed at individuals, farm organizations, and USDA agencies interested in promoting diversification. The video explores such topics as urbanization, specialty crops vs. traditional crops, sustainable agriculture, and marketing.

5. OSSA promotes and participates in conferences on small-scale agriculture sponsored by both public and private agencies. The small-scale newsletter is a billboard for upcoming meet-

ings that help people network with each other.

6. In 1988, OSSA commissioned a study of ongoing USDA research and Extension efforts that could benefit small-scale agriculture. Part of the study is a survey of federally funded research that benefits small-scale agriculture. A detailed investigation of 14,603 Federal and State agricultural research projects seeks to ascertain which of them are of use to small-scale agriculture. A second part of the study was conducted in November 1988, when small farm experts from USDA, State departments of agriculture, universities, and legislatures, as well as farmers, met in a series of four seminars to discuss current research efforts and the unmet needs of small farmers. The results of this study will enable policymakers to set future research and educational agendas to help provide the kinds of information that are really needed.



Small-scale farms may be small in size but can be big in profits. This East Otto, NY, farm targets bus tour groups as customers for its products. (USDA Photo by Ron Sutton)

Regional and Local Approaches

Some of the problems small farmers face can best be addressed on a national level; others, perhaps the majority, are best dealt with on a regional basis. This conclusion became clear in the series of four regional panels—South, Northeast, Midwest, and West—on small farm needs.

Each of the regional panels identified the seven greatest problems facing small farms today. And each panel placed management either first or second on its list of pressing problems.

Panel members identified specific management problems that needed to be addressed and proposed solutions. Although some problems identified were consistent throughout the country, many were characteristic of just one or two out of the four regions. These region-specific problems can best be solved by regional initiatives.

Most of the four panels concluded that to be successful, farmers needed to treat their farms as profitmaking businesses. However, there are distinct regional differences in attitudes about farm life that needed to be addressed. Many farmers in the South view the farm as the “old home place” where the family lives and makes as good a living as possible. In many parts of the Northeast and West—in areas threatened by urbanization or suburbanization, which have taxes based on the development potential of the land—the farm is much more likely to be viewed as an economic unit that has to justify the value of the land. In the Midwest, many people believe that the farm is a way of life rather than a business and, further, that viewing it as a business could destroy that way of life.

These differences affect management style and content. In the Northeast and



Valuable greenhouse space is used not only for bedding plants but also for hanging pots containing herbs that will be soon be ready for market. (USDA Photo by Ron Sutton)

West, economic forces compel high-level management; in the rural South, tradition and a lack of outside pressures permit subsistence management; in the Midwest, there is a tension between the need to make a profit and the reluctance to view farming as a business. While agricultural professionals may encourage treating farming as a profitmaking business, these strong regional attitudes can defeat this goal. Although a businesslike attitude is vital, the way this belief is translated into action must vary from region to region.

Importance of Small-Scale Farming

The economic impact of the small farm community reaches far beyond the value of food and fiber produced. By working on the land, consuming products and services, and working part time on other jobs, small farm people keep rural America vital. Schools and churches stay open, stores continue to do business, farm implements are sold: the infrastructure of the country remains intact.

Integrated Resource Management for Colorado Beef and Sheep Producers

Since the early 1980's, Colorado beef producers have significantly improved the efficiencies (cost and physical production) of their businesses. Producers more fully recognize the importance of an integrated management approach to the farm or ranch business. The future points more and more to the continued attention of land-grant universities and other agricultural entities to integration of all facets of farm or ranch business management.

The Colorado Integrated Resource Management (IRM) project was formally initiated July 1, 1983, with the goal of "increasing by 10 percent the pounds of calf produced per economic unit, in a financially beneficial way, within the next 5 years." Achievement of this goal stressed an overall increased level of reproductive management and:

- Reduction in the length of the breeding season,
- Reduction in calf and cow losses due to abnormal or difficult labor/birth,
- Reduction in newborn calf losses due to disease, particularly diarrhea, and

- Incorporation of sound economic analyses in management decisions.

To achieve the primary purpose of the IRM project of maximizing profits at the farm level, improvement of management in three major areas—production, finance, and marketing—must be addressed. These areas are highly integrated. Producers must develop a complete management and analysis system. Thus, the IRM project was conceived as an multidisciplinary, management-oriented study of beef cattle production and associated resources.

How IRM Began

Representatives from the Colorado Cattlemen's Association, Colorado Wool Growers, Cooperative Extension Service, and the Agricultural Experiment Station planned the project in December 1982.

The IRM project combined the expertise of ranchers, Cooperative Extension Agents, and an IRM investigative team, reflecting the integrated, multidisciplinary nature of the project. Viewed

Norman L. Dalsted, Associate Professor and Extension Farm-Ranch Management Economist, and
Paul H. Gutierrez, Assistant Professor and Extension Farm-Ranch Management Economist, Colorado State University, Fort Collins, CO

separately, each seems to represent one of three levels of activity—the producer, the technical adviser, and the researcher.

Disciplines included at the level of the IRM team are reproduction physiology, range management, agricultural economics, animal science, veterinary science, and wildlife and recreation.

The Colorado IRM project currently involves eight participating ranchers. Dispersed throughout the State, they represent the major geographical and climatological regions—that is, high plains (northern and southern), high mountain country, and western desert. Each works closely with a local Extension Agent.

The first task of an IRM agent, ranch cooperator, and the local Extension Agent is to develop a 5-year ranch plan with production and performance goals. Additionally, the Extension Agent and

rancher are to identify those problems that the cooperator perceives as most immediate. The cooperator must actively participate in the program, identify important problems, and implement the program.

Systematic Approach

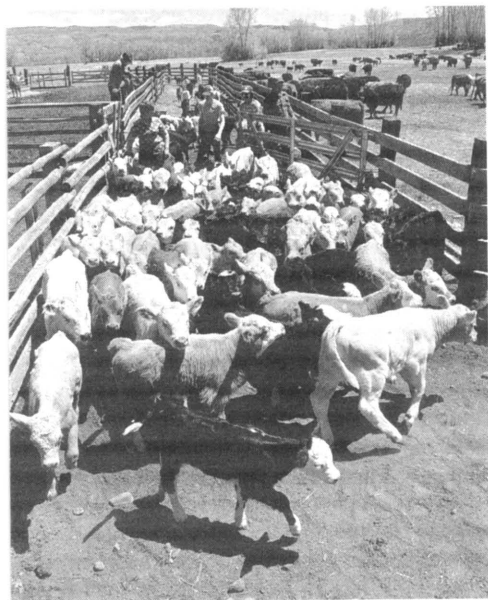
The IRM project's philosophy involves a systematic, team approach to problem solving and decisionmaking.

This aspect of the IRM project is extremely important. Since the financial burden of any changes incorporated into the existing management scheme is borne by the individual cooperator, it is the responsibility of the entire IRM team to provide as much information as possible relating to the potential benefits and costs of alternative actions. For example, a recommendation by a beef specialist that a cooperator maintain production records on his or her breeding herd to assess performance must include information about the potential benefit/cost tradeoff.

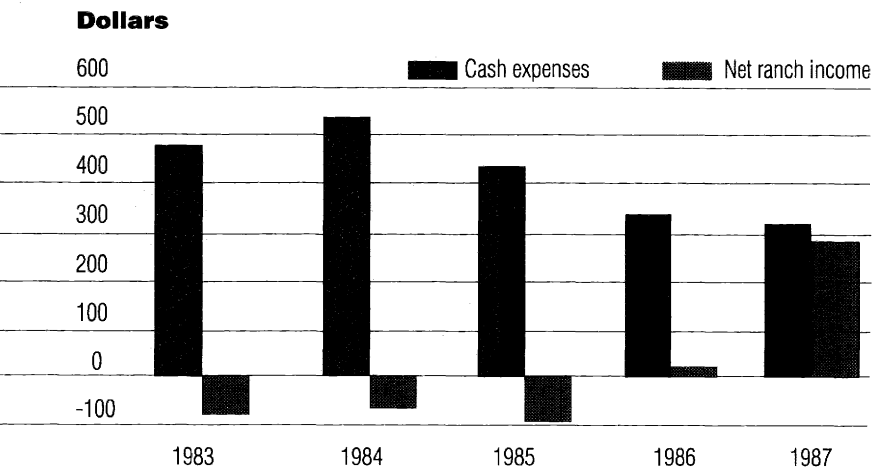
Accomplishments and Results

The following ranch experience might help to demonstrate the effectiveness of an integrated management approach to problem solving.

The ranch was one of the initial cooperators involved in the IRM project beginning in 1983, so production and financial data have been collected for a 5-year period. The ranch is a family-owned operation located in eastern Colorado. The ranch derives its income solely from the sale of livestock. Crops that are grown are for feed. The size of the breeding herd in 1983 was 165 mature cows with 40 replacement heifers. The ranch business was not generating a profit nor making any progress on reducing debt. Changes were incorpo-



Calves are being separated from their mothers as a way of getting them ready for branding. (USDA Photo, 0578X537-29a)

Figure 1. Cash Expenses and Net Ranch Income Per Cow

rated by this producer to change this situation.

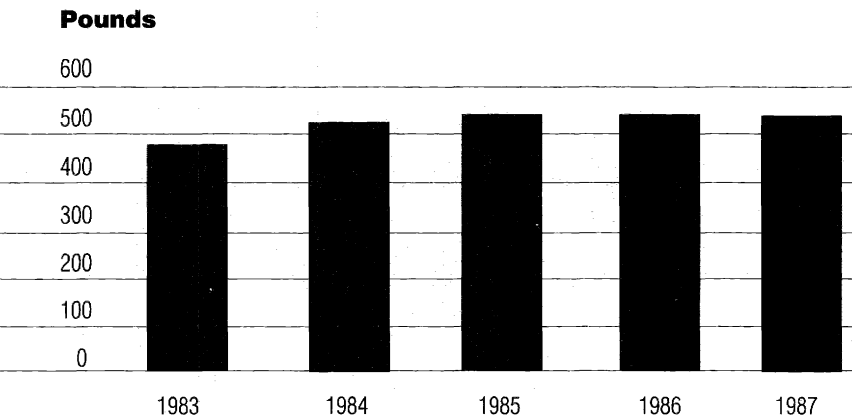
The ranch cooperator maintained herd performance records in Colorado's Beef Improvement Program. After extensive analysis, members of the IRM team made recommendations that addressed the high replacement heifer rates, feeding and nutrition program, reproduction and genetics, debt restructuring, cost of production, sources of feeds, and range management practices. Not all of the recommendations were implemented. Changes in the management philosophy of the operator occurred during a 2- to 3-year period.

This ranch operation made some significant operating cost adjustments (figure 1) from 1983 to 1987. Total cash operating expenses in 1987 were 52 percent of the total cash operating expenses in 1984. A significant reduction in purchased feed is the most readily identifiable cash saving. Certainly, lower feed prices in 1986 and 1987 have had some impact, as well as a reduction in herd size. However, this producer has made significant changes in

his nutrition program. In previous years a "warm up" program preceded the marketing of his calves. He also was overfeeding his cow herd. With careful management of his feed supply (raised and purchased), he has reduced his feed costs by nearly 75 percent of what the costs were in the 1983-84 period. This has had no appreciable negative impact on the condition of his cow herd or his weaning weights (figure 2). The 1987 market conditions benefited producers who had 450-500 pound steers.

The 1983-85 period was difficult financially. To reduce the level of operating debt on the operation, breeding stock (pairs) were sold in 1984 and 1986. Currently, the cow herd can support and pay off the operating debt in 3 years or less if cattle prices are \$70-72 per hundredweight for calves. Total cash expenses per cow have been reduced from a high of \$537 per cow in 1984 to \$308 per cow in 1987—a \$230 average reduction per cow. Net ranch income (profit) per cow increased from a low of -\$94 in 1984 to a high of \$286 in 1987 (figure 1). Certainly, improved

Figure 2. Adjusted 205-Day Weaning Weight



market prices for cattle have had a significant impact on profit, but not nearly as significant as the cooperator's ability to reduce costs. The turning point in the operation was in 1986, when the cooperator had a positive net ranch income. Clearly, some major changes in the operation were put into place during this period. Cash operating costs were significantly less than for the previous 3 years, cash receipts increased, and the cow herd was reduced (inventory change of -\$31,019), thus resulting in a reduction in interest costs.

One of the questions raised by this cooperator was assessing the optimal herd size given his resources. It appears that a cow herd of around 150-170 animals will be able to meet the goals of this cooperating rancher and his family.

The ranch has made significant improvements in its overall financial condition. The cooperator will continue to generate a positive income for this operation by carefully monitoring his financial position and his production scheme.

The Future

One aspect of the IRM project which has clearly supported its purpose is the uniqueness of each ranch involved in the project. Each ranch and its owner/operator are unique in resources available, production practices and methods, financial structure, marketing strategies, and management skills and techniques. Certainly, ranchers may agree on identifying a problem, but actions that solve or mitigate one individual ranch's problems may not work for another ranch. Recognizing this diversity among the livestock operations in Colorado is the key to the success of the IRM concept.

The IRM team at Colorado also recognizes the need to disseminate information to producers on a broader base than the eight cooperating ranches. To meet this need, the team has developed computer software and supporting documentation in addition to comprehensive workshops and programs that promote integrated management techniques and procedures that have proven economically effective on cooperating ranches. Furthermore, the IRM program at Colo-

rado has recently initiated the IRM “cluster” concept, with a single primary cooperator in an area functioning as the focal point of IRM program effort for several other surrounding ranches. The IRM cluster ranches are supported by local experts including County Extension Agents, lenders, veterinarians, regional economists, employees of the Soil Conservation Service, and other resource people.

The focus of the IRM project is first correctly identifying what the problems are, developing an understanding of the interrelationships, evaluating the feasible alternatives, and finding a resolution. Certainly, the bottom line is critical to today’s livestock producer; therefore, the economic evaluation—integrated with the production, nutritional, herd health, range and forage, and other related topics—offers a key to long-term success for livestock producers in Colorado.

State Government Works with Farmers To "Grow Up" Florida Agriculture

Florida is a long State, arcing along the northeastern edge of the Gulf of Mexico and stretching some 850 miles from beyond Pensacola to Key West. Tourism and business advertisements usually depict Florida as mostly beaches, coasts, and bass fishing lakes—a place for vacations and retirement villages with an agricultural industry of only citrus.

In reality Florida, and especially the State's agricultural industry, is quite diversified. Most of our agribusiness is carried on inland, away from the coastlines and low water areas, on what we call the "central ridge" of the State. In fact, about half of Florida's counties are rural and have agricultural economies.

The majority of Florida's rural counties lie across the northern, nearly 400-mile-long portion of the State. This is an area with Old South character and towns where several pre-Civil War plantation homes still exist.

In reviewing economic development activities in other States, we have observed that, like Florida, most States

wish to assist in improving the economic plights of farmers and rural communities. However, the majority of ongoing programs seem to be more rural than specifically oriented to agriculture. Many of these programs are composites, with the different component parts located in a number of different agencies and educational institutions. Since the problems of Florida's rural counties are similar to those of many other rural counties across the United States, our efforts may be of interest to farmers in other States and to their State and local government leaders.

In 1986, the Florida State government, led by Commissioner Doyle Conner and a few other leaders, concluded that good planning and followup action would improve the economic well-being of Florida's rural counties. The major obstacle was answering the questions: What exactly needs to be done, and where should we begin?

We decided to focus on only a specific aspect of rural development to concentrate efforts and maximize the im-

Clifton Savoy, Administrator, Agricultural Economic Development Program, Florida Department of Agriculture and Consumer Services, Tallahassee, FL

part of the limited dollars that would be available. Since agriculture constitutes the economic base of rural counties, our focus became “agricultural economic development.”

We began by reviewing literature about related projects, not only in the State of Florida but also in other States and those of the Federal Government. As a result, we developed a discussion document and a working draft of an “Agricultural Economic Development Policy Act” (AED). Before enactment by the Florida Legislature in 1987, numerous modifications were made, indicating to us that many important policy issues were being raised and easy courses of action were not apparent.

The 1987 AED Policy Act (Chap. 87-229) was enacted for a duration of only 2 years to allow us to continue our reviews, learn, provide hands-on agricultural economic development assistance, and draft long-term plans and programs.

Hands-On Assistance

In 1986, a small group of catfish growers met to discuss their future in growing fish in northwestern Florida. Each of their businesses had saturated the roadside and fish-out markets near their farms. Therefore, they needed to establish a fish processing operation or to link with an established operation in order to generate a new outlet for their fish.

Since the group was made up of only 14 small-scale growers, they decided that their individual needs would best be served as a unit. With help from the County Extension Office and the Florida Department of Agriculture and Consumer Service (FDACS), plus a few dollars out of their pockets, they soon became the West Florida Food Fish Producers Association (WFFPPA), a

nonprofit corporation. Theron Cook was elected president.

Little progress was made until early 1988, when WFFPPA contacted Commissioner Conner for planning and developmental assistance from FDACS under the AED program. As a consequence, AED program staff—working with Ole Ellis and Tommy McDonald of the Washington County Chamber of Commerce and David Solger, Washington County Extension Director (representing other area county chamber and Extension offices)—began to provide organizational and business planning assistance to WFFPPA.

Soon WFFPPA applied for commercial agribusiness assistance under the FDACS AED program, to establish a vertically integrated agribusiness by combining fish production and processing operations. Commercial business assistance was granted in the form of leasing harvesting, processing, and marketing equipment to WFFPPA. However, assistance was contingent upon WFFPPA: 1) being able to contract out for the processing and marketing operations, or 2) being able to finance the operational costs and employ a qualified manager to run its own processing operation.

The member-growers of WFFPPA soon realized they would have difficulty financing their individual fish production expansion, let alone building or leasing and operating a processing facility. They would not have sufficient ability or cash-flow to stand on their own. They would have to “grow up” a little.

We use the term “grow up” to mean developing new agribusinesses and jobs from within the county using local resources and people. For rural leaders, “growing up” is a realistic alternative

to the traditional economic development strategy of improving the economy of one county at the business loss of another by enticing a company to relocate from another State or county. Of course, if relocation occurs, there is no net increase in jobs.

After learning how to recruit and screen potential contract processors, WFFFPA entered into a contingency contract with a fish processor, and requested approval to move forward in establishing its vertically integrated agribusiness. This request was approved. However, to ensure business success, the State agencies cooperating together under the AED Policy Act would continue to provide technical help. FDACS AED program staff would oversee activities and give needed assistance, as well as acquire and monitor equipment setup. Other agencies, such as the Washington County Extension Service and Chamber of Commerce, would provide local development assistance (further organization, member recruitment, fish production seminars, business finance, banker education).

Because a processing facility, as well as harvest and transport services, are now available to WFFFPA, a stronger interest in catfish production has developed; new ponds are being built and existing ponds are being modified and restocked for production. WFFFPA began 1988 with 15 producing members; by October 1988, membership had grown to 35. At the present rate of progress and growth, more than 100 grower-members can be anticipated by the end of 1989.

Washington County Extension Director Solger recently commented that "the increase in people looking for information to grow fish . . . was a result of the

processing market outlet being established." A true estimate of the volume of fish and the overall economic impact of local processing and marketing cannot be made at this time. However, growth is being closely tied to marketing ability.

Have We Grown Up?

We have learned that the strategy of "growing up" or nurturing the development of local businesses is important to rural counties where agriculture is the major contributor to the economy and inextricably linked to other rural businesses in the community and region. For many counties, it may be the only economic development opportunity.

It is also important to understand the key elements that have undergirded Florida's statewide, interagency agricultural economic development efforts. These elements are: (1) leadership at both the State and local levels, (2) willingness to look at new ideas and strategies, (3) indepth planning, (4) the desire for something positive to occur, and (5) continuous action.

The development of WFFFPA into an economically viable agribusiness represents one example of applying the strategy of "growing up" businesses and jobs from within the local county. Other agribusinesses have been or are being developed in Florida under the new Agricultural Economic Development Policy Act and program. Our focus has been on farmers and their natural resources.

Part VIII



The Future:

Challenges for Farm Managers

Challenges Facing Farm Managers

Decisionmaking has always challenged farm managers. They have never had all the resources they needed; nature's bounty has never come easily, nor regularly; and consumers' incomes have ebbed and flowed, making markets volatile.

These circumstances are not likely to change in the future. Commodity markets will be more sensitive to food fads, and competition for U.S. and international markets will be more global. Production technology may be even more dynamic, so continued heavy investment will be necessary to remain competitive and to provide business growth. Interest rates will be as important as ever, and agricultural lenders may be more conservative. Along with these traditional concerns is a relatively new one—society is becoming increasingly vocal, especially about environmental concerns.

In short, future management challenges will be complex. Farm managers are asking, "What must I do today to be ready for tomorrow?"

Objectives, Goals, and Priorities

Nothing is more important to business success than having general long-term business and personal objectives. Once these long-term objectives are set, every major task should have an objective, a time deadline, and performance standards set jointly with the person responsible for results. Specific goals should guide strategies based on management priorities. (See Part II, Chapters 2 and 3 on setting goals and resolving conflicts.)

In agriculture, where families may be closely intertwined with the business, it can be critical that individual and family objectives and goals mesh with business goals and objectives. It is especially important to be sure that all involved family members agree on objectives for the business, and that their personal objectives can be met. This activates the talents and creativity of people, which make the business perform.

John Holt, Professor and Extension Economist-Management, University of Florida, Gainesville, FL

A business growth goal is most frequently overlooked. Its importance lies in pointing management attention toward changes that might offer opportunities for the business. Growth is necessary to reward people who make the productivity possible, be they family members or key employees. However, financial events in the early 1980's showed clearly the danger of overly ambitious growth goals and the need for attention to a defensive posture in financial management.

Financial objectives usually involve (1) growth in equity, constrained by investment limits, (2) profitability for the farm overall and for individual enterprises, and (3) spending goals controlled by discipline and cash-flow plans. Adhering to an overall profitability goal would have allowed more farmers to leave the economic turmoil of the 1980's with some equity.

When making decisions about whether to maintain or close a business enterprise, a key question is: "Knowing what I know now, would I enter this business or enterprise?" If the answer is no, then evaluate exit strategies. If the answer is yes, activate plans for growth as finances permit.

Analyzing Successes

"Companies don't get in trouble during recessions, they get in trouble during prosperity," according to Thomas Watson, founder of IBM. Success breeds excess internally by causing a lack of attention to efficiency, and externally by encouraging competition for strong markets. Finding out what made things work well is followed by asking, "How long will the good times last?" The management search is for changes taking place that could create opportunity, as well as cause problems.

Correcting Course

Course correction is vital: no plan is useful for very long. Since the future cannot be accurately predicted, a course is set toward objectives; progress is monitored and strategies are reexamined regularly.

When financial conditions constricted in the 1980's, some family operations dissolved because differences in individuals' goals and objectives created irreconcilable differences about strategies for enduring the adverse economic times. Prosperous times can cause serious disagreement about reinvesting, or spending, profits.

A trusted employee dies; the local bank is bought out by a chain and fires its agricultural lenders; the neighbor with whom you share equipment moves to Florida; your health turns bad; you find out your child wants to be a rock star. All of these things have happened to others, could happen to you, and might have serious consequences.

The basic strategy for dealing with possible risks is to think through their consequences; for the ones that are vital, be sure that things are still the same as you thought they were. An annual update might not be a bad idea.

"Management by exception" can guide changes in a basic plan. This technique is effective if performance yardsticks are set and progress is monitored. In financial management, there should be a monthly cash-flow plan, and changes in operating plans would be signaled if expenditures were more than 10 percent over budget. Considerable management skill is needed in setting the "warning flags" or exceptions correctly, so that they signal management attention to a problem in time for course correction.

Decisionmaking, like any other difficult activity, takes practice. Computerized spread sheets can help managers analyze the consequences of important "what if" options. However, the use of computers can be disastrous if generating numbers is substituted for serious thought about opportunities and problems.

Adjusting to Regulatory Constraints

Few regulations increase farm income. Learning about, and complying with, the rapidly changing regulations affecting farming takes quantum chunks of the most valuable resource of all—management time. In addition, complying with regulations sometimes changes the character of the farm, or takes substantial investment. Regulatory costs are especially onerous on small farms, where the manager is also the labor force and has no office staff to help with the learning and paperwork problems.

Manage for the Future

Actively seeking information about an unfolding future is critical in evaluation and planning. As future information becomes available, managers screen it by asking: "Is it so?", "Why is it so?", and "How long will it be so?" The final question—"So what?"—tests its impact on people, on marketing, on production, on finance, and on both the long- and short-term business goals.

The better managers make time, at least annually, to be sure their long-term objectives are still valid, and that important people in the business share them. They review the profitability of the overall business and individual enterprise, eliminate the unprofitable enterprises, and spend considerable time

trying to improve the successful ones. These managers measure business financial strength and continually assess the level of risk they are willing to tolerate as they develop marketing strategies and borrowing plans. Exceptional managers study outlooks for inputs and commodities, and make preliminary plans for how much of what crops to plant. Skillful farm managers obtain competitive bids on major expense items, and tailor tax management strategies to long-term objectives.

Peter Drucker, the preeminent management thinker of our time, has this to say about managing change: "There are no solutions with respect to the future. There are only choices between courses of action, each imperfect, each risky, each uncertain and each requiring different efforts and involving different costs. But nothing can help the manager more than to realize what alternatives are available to him and what they imply."

The Changing Financial Environment

The trend toward a farm sector composed of a large number of small, part-time farming operations and a much smaller number of large commercial farms will continue. Agricultural lending is also undergoing major changes in order to service these two distinctly different classes of farms.

Farms relying primarily on off-farm income for repayment ability will be handled primarily as consumer borrowers. These loans will be subject to fairly standardized rules based on percentage of income devoted to debt servicing, overall debt-to-asset ratios, and specific collateral margin requirements.

Large commercial farms will be viewed as agricultural businesses and handled much like other commercial loans. They will be subject to more information and documentation requirements, increased emphasis on repayment ability, and longer run general economic and specific enterprise outlook analysis, particularly for term loans. Compared to traditional farm loans, these loans will require the managers of these commercial farms to develop much more sophisticated business

plans and management information systems to track total farm as well as specific enterprise performance.

Lenders will also place increased emphasis on a better balance between equity and debt funding. More of the commercial farms will be vertically integrated, involve multiple ownership, and be more heavily involved in the leasing of farm machinery and other assets. Loan analysis will be more sophisticated than in the past.

Basis for Changes in Lending Decisions

Increased emphasis on repayment ability and risk analysis will affect the availability of agricultural credit more than the supply of loanable funds. Dramatic changes have already occurred, but even with all that has been said and written about cash-flow requirements, the analysis of repayment capacity is still in its infancy. While many agricultural lenders have improved their written loan policies, there remains a significant gap between policy and practice.

Danny A. Klinefelter, Texas Agricultural Extension Service, Texas A&M University, College Station, TX

Until recently, many agricultural lenders based their loan decisions primarily on their knowledge of the borrower, the borrower's past repayment record, the borrower's financial position, and the adequacy of collateral margins. While these are still necessary and important, they are not the only considerations for a sound loan.

Balance sheet or collateral-based lending has two major weaknesses: (1) it considers only the protection of the lender; that is, it does not address whether the loan will benefit the borrower, and (2) its primary underlying consideration has been the expected recovery value of the collateral at the due date of the note or at the date of the next scheduled payment. Therefore, there has been a tendency for lenders to be more liberal, resulting in excessive borrowing when asset values are appreciating, and excessively conservative when asset values are declining. This practice has resulted in large numbers of borrower failures and loan losses whenever asset values have taken a sharp downturn. In the future, more emphasis will be placed on repayment ability, with collateral being viewed in its proper role of providing insurance and control, not as the justification for lending or borrowing.

More Than Cash-Flow Analysis Needed. Many lenders and farmers limit their analysis of repayment ability to examining annual cash-flow projections. Projected annual cash-flow is an important element of repayment ability, but it is strictly a short-run analysis. A business can be going broke and still generate a positive cash-flow for several years by reamortizing debts, selling off assets (including inventories), and not replacing capital assets as they wear out (living off depreciation). More-

over, because cash-flow projections are based on expected values, the actual outcome is subject to considerable uncertainty. Not enough effort has typically gone into evaluating the impact of alternative possible outcomes. Even in those cases where an attempt has been made, it has usually involved evaluating some standard scenario such as a 10 percent or 20 percent decrease in revenues. This is a first step, but does not account for performance history or the risk inherent in an individual business.

The frequently neglected half of repayment capacity has been the evaluation of historical and projected profitability on an accrual basis. Cash-basis income accounting can lead to lags of as much as 2 years in recognizing developing profitability problems. The reverse is also true: cash-basis accounting delays recognition of profits during growth periods when the problem may be more liquidity than profitability. Occasional or periodic losses can be tolerated, but negative income trends need to be a major consideration in any sound financial program.

Another problem has been the lack of consistently prepared information based on something at least approximating generally accepted accounting principles. In too many cases, agricultural credit analysis is based on data which can be fairly described by the phrase "garbage in—garbage out." Many lenders still do not require balance sheets for both the beginning and end of the period for which income is measured; instead, they go through a series of numerical gymnastics in an attempt to reconcile the changes in net worth during the period. Lenders will increasingly require farmer borrowers to provide financial statements as of the

end of the accounting period. Most other types of business borrowers already face this requirement.

Other needed changes include the development and implementation of standards for evaluating key financial position and performance indicators for different types of farms. To the extent that rules of thumb now exist, they are usually generic, and not very useful in comparing a dairy operation with a grain farm, for example. At some point in the near future, industry standards will be developed for different types of farms similar to those now used by non-farm businesses. Currently, lenders are a long way from getting the information needed to analyze the performance of different enterprises, both within and among firms.

Restructuring the Farm Credit System

Two areas of restructuring will have the greatest impact. The first is the merger of unlike entities. This includes not only the existing single Farm Credit Bank in each district, but also the merger of Federal Land Bank Associations (FLBA's) with Production Credit Associations (PCA's) to form Agricultural Credit Associations. Both units are direct farm lenders and, except for tax purposes, there are questions as to how much sense it makes to have separate corporate entities who, in some cases, are competing with each other. At the association level, merging lending functions helps not only with marketing and account servicing, but also with loan structuring and control. In addition, mergers can reduce unnecessary duplication and consolidate capital.

The second area involves district mergers, and its outcome is less clear. While there are obvious economic advantages, there are potential disadvan-

tages and more political resistance at the local level. Yet, in many cases district mergers make sense. Improved communication technology, fewer associations, and the shifting of examination responsibilities to the Farm Credit Administration also reduce the need for the current number of districts. To the extent the secondary market for farm real estate loans ("Farmer Mac") is successful, it is unlikely that the Farm Credit System will regain the market share it once had. There are also economies of scale in fund raising, risk management, purchasing, applications of technology, and so forth. Another advantage is the ability to diffuse geographic based politics on district boards.

The most obvious disadvantage is short run, but very real. Reorganization tends to be disruptive both to employees and borrowers each time it occurs. There is a learning curve and an acceptance period involved which no amount of economic logic can eliminate.

Whatever happens at the district level, there will continue to be a physical downsizing in the field. There simply is not the need or economic justification to maintain the current number of field offices, particularly in districts where the PCA's and FLBA's are consolidated. There will also be a continuing merger of associations into larger units and a movement toward maintaining offices only in agricultural trade centers.

Differential Loan Pricing. This will be a major factor in determining the extent to which the Farm Credit System will be able to serve the emerging commercial farming sector. Unless the system begins to competitively price loans to borrowers who qualify for preferred rates with other commercial lenders based on their lower risks and servicing costs, it will be priced out of the

market for the most creditworthy borrowers. This will, in turn, cause higher rates for remaining borrowers. The issue of equity versus equality has long been a problem for most cooperatives, and the longer a cooperative retains the traditional concept of equal pricing, the more the market will tend to reward it with fewer of both the bigger and the stronger customers. Differential loan pricing benefits all borrowers, a fact not well understood by some borrowers paying higher differential rates. By lowering the operating expense rate, increasing profits, and lowering overall portfolio risks, the rate charged to the more marginal borrowers will be lower than if the preferred customers move to other lenders.

Commercial Bank Adjustments

The commercial banking system is also in the midst of some major structural changes, and nowhere will these changes be more evident than in rural agricultural banks. The establishment of regional loan production offices by major banks and the accelerating movement toward statewide and interstate banking will change the competitive situation in many agricultural markets. Twenty years ago, banks with less than \$25 million in assets held 70 percent of bank farm loans. Today, that group holds only 18 percent of these loans. Over the last decade, those banks classified as nonagricultural, but which hold more than \$2 million in farm loans, have become the most important group of banks financing agriculture, and their importance is increasing.

A large number of independent rural banks are going to go the way of automobile and implement dealerships in small towns across the country. Many of these primarily agricultural banks

suffer from a shrinking local retail base, growing competition for their best agricultural borrowers, and limited diversification of their loan portfolios. In the Southwest and parts of the Southeast, problems were compounded in areas where the economy was also heavily dependent upon the oil and gas industry. The combined slump of energy and agriculture adversely affected these banks almost as much through the multiplier effects on the local economy as through direct loan losses. In primarily agricultural areas, the survival of these banks will depend largely on the extent of their participation in Farmers Home Administration (FmHA) subordination and loan guarantee programs. In most cases, these banks will not be attractive acquisition targets for the larger banking systems, since the bigger banks do not need local physical facilities to reach the commercial market they are after.

Other changes that could affect agricultural lending by commercial banks are an overhaul of the Federal Deposit Insurance Corporation (FDIC) and a change in capital requirements for some banks. Specifically, two developments will likely work to the disadvantage of agricultural banks:

1. Reform of the deposit insurance system designed to vary FDIC rates according to perceived risks, and
2. Raising of capital requirements for "higher risk" banks.

Many agricultural banks could lose on both of these issues even if their loss experience has been favorable, because they loan heavily to a single high-risk industry and because of their limited market alternatives.

Commercial banks will overcome a major competitive problem with the creation of the secondary market for farm real estate loans. This is particu-

larly true for rural banks, which needed a way to compete with the Farm Credit System as it moves toward one-stop financial service centers, and also needed a funding mechanism which allowed them to compete more successfully with larger banks and other real estate lenders in terms of access to funds, interest rates, loan maturities, and legal lending limits. This will not only benefit farmers, but it should also help rural communities by making local banks more viable.

Farmers Home Administration

Over the past few years, there has been a significant shift in FmHA loan policies and programs. These changes will have a significant impact on FmHA's long-term role.

End of Unrestricted Credit. The first of these changes started in 1984 with the discontinuation of new loans under the Economic Emergency Loan Program. This program contributed significantly to the extent of the farm financial crisis. The Economic Emergency Loan Program made billions of dollars of subsidized credit available at a time when real interest rates were already low to negative. By so doing, the program exacerbated the problem by deferring normal market adjustments, holding excess resources in agriculture, and artificially supporting asset values.

When farm income began to decline in the mid-1970's, farmers who had been only marginally successful even in the boom period, as well as farmers who had inadequate repayment capacity, began to find credit markets tightening up. Even so, successful farm operators would and could have purchased the assets if the market had been allowed to force unsuccessful operators out of agriculture. Instead, the Federal

Government reacted by assuming the situation was a temporary phenomenon and instituted a bailout program. As a result, excess resources were held in agriculture, thus backlogging the adjustment process and, at the same time, supporting the continued bidding up of land values and the acquisition of additional nonreal estate capital. Thus, when the adjustment occurred, it started at higher levels in terms of both the number of financially-stressed farmers and the value of assets involved rather than through a series of more moderate adjustments. Because of this experience, the Federal Government may not be as inclined to use credit to try to correct an income problem in the future as it has been in the past.

Guaranteed Loans. The second major change will be the continuing shift away from direct loans to guaranteed loans. This policy will ultimately make better use of FmHA's thinly stretched personnel and increase the efficiency of the loan decision process. It will also mean that the cost of funds will be higher to the borrower under a guaranteed loan handled by a private lender than if it were a direct loan based on the government's cost of funds. However, because of the increase in borrower protection legislation, stricter loan classification by external examiners, and tougher loan policies, the guaranteed loan program represents the only means by which many marginal or high-risk borrowers can obtain commercial credit.

Secondary Market Implications

The creation of the Federal Agricultural Mortgage Corporation (Farmer Mac) in 1988 will increase the number of sources of long-term agricultural credit available to farmers and ranchers. But, while this increased competi-

tion will benefit the most creditworthy borrowers, many farmers and ranchers are going to find that they do not meet the credit standards required by the secondary market.

From the borrower's standpoint, the secondary market should increase the availability of fixed-rate long-term financing. It should also enhance the ability of people in small rural communities to obtain financing for moderately priced homes. Because other lenders will now be able to offer a full range of financing alternatives and be able to tailor a total loan package to the borrower's needs, the secondary market will also increase the competitive pressure on PCA's and FLBA's to merge in order to be able to offer the full range of loan services.

In addition to the advantages to rural commercial banks previously mentioned in the section on commercial bank adjustments, the secondary market will also provide a means for reducing portfolio risk through loan diversification. For example, in some areas lending to agriculture has a relatively high risk because production is concentrated in one or two commodities and because geographic diversification is limited. By selling some of the loans from the local area and purchasing participations in loan pools from other regions of the country, lenders will be able to use the secondary market as a risk management tool.

Nontraditional Lenders

New lenders, including subsidiaries of major input supply firms such as Pioneer, Deere, and Cargill, will likely assume a greater role in the credit market. While captive finance companies have existed for a long time, these firms are gearing up with a whole range of financial services and, in most cases,

are not nearly so constrained as commercial banks or the Farm Credit System in terms of the services they can offer.

The impetus for this growth stems from several sources. Obviously one is the need to evaluate whether a customer can pay for what he or she buys. The downturn in the agricultural economy, the reduced purchases of inputs due to set-aside and Conservation Reserve Program (CRP) acres, and the general trend toward reduced input farming have resulted in a significant reduction in sales. Thus, these firms are seeking ways to diversify and expand their revenue base. Some may even enter the secondary farm real estate market. Because of their low overhead and delivery costs, access to money markets, and existing relationship with producers, they will be a major force to be reckoned with by traditional agricultural lenders.

Equity Capital

Agricultural credit will likely grow slowly for the next few years, due to more internal financing by producers, increased vertical integration through both direct ownership and contractual arrangements, and additional outside investment.

While changes in the tax laws have reduced investor interest in some types of agricultural investments, reduced land values and increased prospects for long-term appreciation should attract outside capital. This will be particularly true if the rate of inflation increases, because land has traditionally been viewed as a good inflation hedge. It will also be a side effect of any increased uncertainty or downturns that occur in the stock market as investors seek investment alternatives. Outside investment will be enhanced by changes in leasing arrangements and an increasing

recognition by farm operators that profitability and viability are more a function of resource use and control than they are of resource ownership.

Another potential source of equity capital may come in the form of equity participation loans. Insurance companies were beginning to show interest in shared appreciation mortgages when the farmland market was robust. Yet these mortgages are even more profitable just after a market has gone through a downward correction. Equity participations also have a tremendous potential in seller financing of farmland, especially for retiring farmers who will be living off the proceeds of the sale. Such loans offer this group three potential advantages: (1) improved marketability because of better financing terms, (2) a hedge against future erosion of the purchasing power of a fixed income, and (3) the potential to recapture part of the equity losses they would incur by selling near the bottom of the market.

A largely untapped, but significant potential source of equity capital from outside the agricultural sector lies in attracting minority interest investors. Two instruments which could become more widely used to attract these funds are buyout agreements and participating preferred stock. Used in combination, these two instruments could reduce the risk to minority investors and increase the liquidity of their investment.

Staying Competitive in the Global Market

As one of the world's largest traders of food and farm products, the United States has generated an agricultural trade surplus every year since 1960. Over 40 percent of the total farm output was exported in 1980, reflecting the "internationalization" of U.S. agriculture. Currently, about 20 percent of the farm volume is exported, accounting for almost 25 percent of farm cash receipts.

Yet, in the 1980's, U.S. agriculture has experienced its most significant period of adjustment since the 1930's. The stagnation of the world grain market in the early 1980's led to a sharp buildup of world and U.S. stocks and to lower prices. Domestic fruit and vegetable producers also faced stronger competition from low-cost, imported products, while nationally important crops such as wheat, corn, and soybeans experienced more competition from subsidized production and exports in the European Community and parts of South America. At the same time, U.S. farm and macroeconomic policies were in conflict, resulting in a stronger dollar pushing loan rates above declining world prices.

In contrast, the volume of world grain and oilseed trade had doubled during the 1970's, with the United States capturing three-fourths of the increase. In anticipation of continued growth in world demand and high prices, U.S. farmers increased production rapidly by farming land that had been idled during the land diversion programs of the 1960's, as well as by increasing yields with more inputs and by using labor and capital more fully. Farmers also borrowed heavily during the 1970's for investments to further increase capacity. Most observers expected international trade to carry U.S. agriculture full force into the 21st century.

However, recent declines in export volume and world market share, growing surpluses, and surging food imports have caused much concern about the future of U.S. agriculture. Some would suggest that the farm sector has become less competitive, and that producers are no longer able to secure a profitable share of the world market. Therefore, major adjustments have occurred which have affected not only the farm, but agribusiness and rural communities as

C. Parr Rosson, III, Associate Professor of Agricultural Economics and Rural Sociology, Clemson University, Clemson, SC

well. This adjustment process is expected to continue.

International Competition

International competition means competition between producers and marketers in the United States and producers and marketers in other countries. But international competition takes place in an extremely dynamic framework. Production capacity, infrastructure, currency exchange rates, export/import restrictions, credit policies, shipping rates and regulations, international policies, and many other factors affect a country's economic position relative to that of competitors.

To be competitive in world commerce, a nation has to secure and hold a profitable share of a specific market in spite of the efforts of other nations to secure that same market. Production costs, infrastructure, and government policy are critical factors affecting international competition.

Production costs are one of the major factors in a country's ability to compete internationally. These costs are affected by the prices of inputs such as seed, fertilizer, land, labor, capital, and

technology, as well as by the natural conditions under which crops are grown. As agricultural productivity increases, input costs per unit decline.

The level of variable (cash) production costs indicates short-run competitiveness. The higher a country's variable costs are relative to those of competitors, the more likely that country will be to reduce output if prices decline. For example, in 1986, average variable costs for soybeans were \$3.90 per bushel in the southeastern United States. Comparable costs in Argentina and Brazil were \$2.50 per bushel and \$3.18 per bushel, respectively (table 1).

As prices declined in the United States, returns above variable costs for southeastern soybeans fell, causing acreage in many States to decline by almost half. When acreage declined, costs per bushel also declined because the better land remained in production. Therefore, remaining production became more cost competitive. Returns to Argentinian and Brazilian soybean production increased in response to higher prices—resulting in greater output.

Table 1. Estimated Variable Production and Marketing Costs for Soybeans

	Full-season soybeans	Double crop with wheat	Internal marketing costs	Ocean freight to Rotterdam	Total landed cost Rotterdam*
Dollars per bushel (1986 dollars)					
United States					
Southeast	3.90	3.05	.65	.34	4.89
Midwest	3.03	—	.65	.34	4.02
Delta	3.21	—	.65	.34	4.20
Argentina	2.50	2.37	.99	.50	3.99
Brazil	3.18	3.05	1.18	.45	4.81

*Full-season variable cost plus internal marketing cost and ocean freight.

The situation for double-cropped soybeans and wheat is quite different. Costs for double-cropped soybeans in the Southeast have been estimated at \$3.05 per bushel. This results from lower fertilizer, chemical, and machinery expenses and compares favorably with \$2.37 per bushel in Argentina and \$3.05 per bushel in Brazil.

However, international competition is much more complicated than cost comparisons. Being the lowest cost producer does not always ensure competitiveness in today's market. Infrastructure—including transportation, communications, electricity, roads, and storage facilities—is critical in determining the cost at which a country can produce and deliver a crop to the international marketplace. Costs of moving U.S. soybeans to export have been estimated to be about \$.67 per bushel, while those in Brazil were \$.51 higher, at \$1.18 per bushel. Adding ocean freight to that results in total landed costs of \$4.89 in the Southeast, \$4.81 in Brazil, and \$3.99 in Argentina.

A country's competitiveness will also be influenced by government intervention in production or trade. For example, a country may be a high-cost exporter, not because of any deficiencies in agricultural production methods or in conditions of soil or climate, but because its currency is overvalued, or because domestic support prices are high relative to world prices, or because competitive exports are directly or indirectly taxed. U.S. agricultural policies have placed soybeans at a competitive disadvantage to corn, primarily because the deficiency payment for corn has resulted in a soybean/corn price ratio favorable to corn production. As land in the United States shifted from soybeans to corn, competitors in foreign countries

responded by increasing planted soybean area.

There are many reasons why countries adopt policies which affect the crops grown and exported. For example, the uncertainties of the export market may prompt a country whose resources are well suited to producing export crops to promote instead the production of basic foods for domestic consumption. Countries with large external debt sometimes turn to agriculture as a source of export earnings to service their debt while importing the capital goods needed for economic growth. Argentina, for instance, has traditionally taxed exports of agricultural crops to finance industrial development.

A nation's ability to develop and adopt new technology also has a marked influence on competitiveness. The United States made tremendous progress in this area relative to other nations up until recent years. It now appears that the technology gap has narrowed, with the United States the loser. In 1980-84, foreign firms received 52 percent of all patents in biotechnology granted in this country, and U.S. firms received 42 percent. Most of the corporations receiving these patents are multinational, and thus quickly disseminate information about important technological changes. These companies respond to profit signals in the United States and other countries. With these other nations undertaking acreage and production expansion programs, it is natural for technology to flow to them. However, U.S. agriculture still leads most other countries in information technology and computer applications.

U.S. Market Share

Domestic policies of the early 1980's, designed to support farm incomes, kept

U.S. export prices from adjusting to the 1981-82 world recession and the rising dollar. The United States thus became a "residual supplier," or supplier of last resort, for grains, resulting in a loss of international competitiveness and market share. Declining export volumes, rising Government stocks, and record high deficiency payments during the 1982-85 crop years led to provisions in the Food Security Act of 1985 for loan rate reductions. In addition, there were mandatory marketing loans for upland cotton and rice, generic certificates, and expanded export promotion programs.

The 1985 legislation lowered U.S. market prices, restored competitiveness to U.S. commodities, and had varying impacts on governments and farmers throughout the world. For importing countries, lower prices save scarce foreign exchange. At the farm level, however, these low prices are causing financial stress. Lower prices reduce incentives for farmers and governments to invest in crop production. Food imports of many developing nations have declined as farmers, who typically represent 70-80 percent of the workforce, experience lower incomes.

Lower market prices also imply higher costs for the governments of exporting countries (including the United States), which use export subsidies to compete in world markets as well as domestic income subsidies to maintain producer incomes. The financial burden on the European Community (EC) to fund its export subsidies while maintaining farm-level price supports above world prices increases as world prices fall. Over \$25 billion was spent on EC farm supports in 1986, representing two-thirds of total EC budget expenditures.

International Financial Markets

The rise in the value of the dollar in the early 1980's put U.S. farmers at a disadvantage because the prices of U.S. farm products increased for foreign customers, while prices of imported goods fell for American consumers. The value of the U.S. dollar was influenced by changes in interest rates and the international flow of capital in response to changing U.S. monetary and fiscal policies.

When the U.S. Government reduced inflation in the early 1980's by restricting the growth of the money supply while also incurring record budget deficits, U.S. "real" (inflation adjusted) interest rates rose. High interest rates induced foreign investors to purchase U.S. assets, easing the shortage of capital funds. Without these funds from abroad, U.S. interest rates would have risen much higher, and either the Federal deficit would have had to be greatly reduced, or a tax increase would have been necessary to make up the difference between Government spending and revenues.



Grain is loaded onto ships at the Port of New Orleans for shipment abroad. (USDA photo, 1076X1320-13)

Foreign investors got the U.S. dollars needed for these purchases by exchanging their currencies for dollars in foreign exchange markets. The demand for dollars and the supply of foreign currencies both increased. As a result, the value of the dollar rose, and the value of foreign currencies declined.

Thus, the public decision to attack inflation in the U.S. economy, combined with the rigid price support levels of the 1981 Farm Bill, had the unintended consequence of pricing U.S. farm commodities above world levels. The higher-valued dollar made it easier for U.S. competitors to be low-cost exporters, leading to lower U.S. farm exports. Conversely, farm exports have increased during 1988-89, partially due to the decline in the value of the dollar.

The current round of negotiations in the General Agreement on Tariffs and Trade (GATT) has important implications for U.S. agriculture. At stake are the domestic agricultural policy programs here and abroad. The United States and European Community are at an impasse over one key issue. U.S. proposals have called for complete elimination of trade-distorting agricultural programs, while the European Community wants to reduce only the level of support. Although technological advances that affect production costs are critical issues, other factors that are currently being debated may have more impact on the U.S. competitive position, particularly in the long term. One thing does appear certain, however: any progress and choices that are made in GATT likely will be within the context of existing domestic policies.

Implications for Farm Managers

U.S. farm managers must be required to develop better financial management

and marketing skills to stay competitive in the global market. Adjustment will be the byword of the 21st century. Those managers with the ability to adjust to the changing world market will be the most successful. Here is why:

Declining Government intervention in agriculture, both here and abroad, will result in more flexibility in farm level decisionmaking. Most managers will learn that relative gains in net returns for improved marketing and management skills will far exceed those for increased production efficiency. To improve farm managers' ability to assimilate and use marketing information requires little capital investment as compared with the purchase of a new tractor, for example, and can be undertaken with minimal cost to the firm.

Those managers who are early adopters of new information technology can expect high dividends. With a low-cost, highly efficient telephone communications system to facilitate electronic information transfer, the costs of new advances in microcomputer hardware and software can be recovered in a short time. Therefore, the use of computer-based decision aids will become especially attractive to U.S. farm managers.

On the international scene, expect competition to remain strong, especially in those countries where agricultural production operates with little or no subsidy, such as Argentina, Australia, and Canada. In parts of the European Community, where agriculture has been supported above the world level, expect to see declining grain output and accelerated consolidation at the farm level as producers are forced to compete at lower prices. U.S. farm managers will be well positioned to respond to this changing global environment.

Farm Managers Evaluate Biotechnology

Technological advancements and breakthroughs have occurred regularly in agriculture. Improvements include environmentally controlled confinement livestock facilities, leaner and more efficient animals, improved animal nutrition, better crop production systems, hybrid seeds, and disease control. A mass substitution of machinery for labor has also helped bring U.S. agriculture to its present highly productive status. While biotechnology represents an arena where some dramatic new discoveries are likely, the tools farm managers use to evaluate whether to use a particular new technology will most likely be tools now available—such as budgeting, cash-flow analysis, and systems analysis. The bottom line is to determine the greatest economic return.

Impacts on Dairy and Hog Farms

For some, a partial analysis of the operation may be sufficient (see Part III, Chapter 6 on partial budgeting). However, this form of analysis should be used with caution, as many technologies may have impacts beyond the spe-

cific enterprise. Managers need to thoroughly examine the interactions on their farms. For example, bovine somatotropin (BST) use in a dairy herd may at first appear to affect only the dairy enterprise. But recommendations on BST include changes in nutrition level and rations with higher energy, so an inventory of cropland and feed handling facilities may be necessary to determine whether existing resources can provide adequate rations. Specific environmental conditions may also be needed.

Porcine somatotropin (PST), like BST, can affect the whole system as well as a particular enterprise. Little is known about the differences in expected production response from PST use in confinement, partial confinement, or pasture swine production systems. Hogs fed PST may be more vulnerable to extreme temperatures, so swine facilities may need to be modified. Moreover, impacts across production systems may not be neutral. PST improves the feed efficiency and average daily weight gain of hogs, producing a leaner product which reaches market weight faster. Thus, the systematic flow of animals

James B. Kliebenstein, Professor of Economics, Iowa State University, Ames, IA



Porcine somatotropin improves the feed efficiency of hogs, producing a leaner product that reaches market weight faster. (USDA Photo by Tim McCabe, ARK-62462)

through the system may be changed. This has implications for level of facility use: Demands for grow-finish space may lessen while demands for breeding farrowing facilities may increase.

Use of PST may also change the behavior of animals. The hogs eat more often and thus are more active, increasing the chance for aggressive behavior. Also, they spend more time at the feeder. Less aggressive hogs may have more difficulty competing, so increased pen space per hog and increased feeder space may be needed.

Evaluating New Technologies

Farm managers will need to identify probable impacts of the new technology on their farm operations. To do so will require knowledge about the technology, its use, and expected production impacts. Changes that accompany a technological advance can include:

- Reduced production costs per unit
- Reduced risk

- Increased production
- New products
- Improved product quality

Economic evaluation of biotechnological advances can be difficult, and subjective judgments may be necessary where data are not available for the type of operation being evaluated. Furthermore, results under research conditions are typically more favorable than those that can be achieved on the farm.

Effective evaluation of technology adoption decisions will involve a number of factors:

- Level of production management intensity
- Level of business management ability
- Business financial health
- Availability and quality of resources

Effective use of many biotechnological products will require improved production management. Some technologies will be complex, requiring a clear understanding of animal biology and all the integrated production relationships. Information on disease population dynamics and epidemiology may also be needed. Intense production management skills will be necessary to effectively integrate all factors—such as changes in crop rotations or the need for quality feedstuffs. For example, cows receiving BST have increased nutrient requirements because milk production levels increase. Swine receiving PST have increased protein needs. In both cases, the net effect is that the cost per pound of ration increases. These impacts need to be compared to the value of increased production, keeping in mind that increased quantities of products available will lower the price received.

Successful adoption of many technologies will require a strong financial position of the business along with well developed business management skills.

Some technologies will introduce a level of instability into the industry over the adoption and adjustment process. Top level business management skills will be needed to effectively manage this instability. Since effective use of some biotechnologies may require costly remodeling of production facilities, survival will be difficult for those in a weak financial position.

Risk

An important decision variable is that of production and income variability. Evaluation of the impact of the technology on production variability is needed since some technologies will reduce variability while others will increase it. Increasing expected production levels may also increase production variability, as well as income. Adoption will depend upon the risk aversion of the producer along with the ability to absorb the potential increased risk levels.

The new technologies may perform very well when all factors perform as needed and in unison; however, an imbalance may dramatically reduce production. This further amplifies the increased pressure for intensive management.

Fixed Costs

The upfront or fixed cost of technology and its effective adoption is an important consideration. Technologies which have high upfront costs for factors such as information and knowledge gathering, purchase fees, and set up can have differing impacts depending on farm size. Large farms may be able to economically incorporate the technology while it would be too costly for smaller operators. Smaller producers may need to rely on outside expertise

and advice for effective incorporation of the product.

Management Options

The relatively large and specialized farm operations have effectively streamlined the process of gathering information and management expertise. They are highly specialized. In comparison, a medium-sized family farm may have from two to six or even more enterprises. Staying current on new production technologies and other forces interacting to cause price or income shifts is a difficult task; the more enterprises on the farm, the more difficult the task becomes.

To remain competitive, the operator may become a specialist in managing some enterprises, and use a consultant or other help for intensive management information for the remaining enterprises. Thus, the operator can capture some of the advantages of both diversification and specialization. This movement to increased use of consultants could be provided by the Extension System, professional farm management firms, or other agencies. This need for information and management advice will come from owner-operated farms as well as those managed for a fee.

Records and Management Skills

The availability of biotechnological products will not alter the success formula for farming. The key to success is, and always will be, effective management. For some technological products, the importance of this success formula will be magnified, and without good management, firms are less likely to survive. Technology has an impact on farm size and effective operating level. Some technologies can be used

effectively regardless of farm size. However few, if any, technologies are uniformly effective in every size operation. Some technologies may have fixed start-up or purchase fees that are not related to the volume of production. Thus, larger operators will generally continue to have an inherent advantage over smaller operators.

Biotechnological advancements will further increase the need for good recordkeeping—magnifying the need for effective and intensive management. Managers will need better records to aid in management decisions. Knowledge of production levels and goals are needed. Operations with subpar management may gain little from adoption of biotechnological products, but those with top level management will be in position to make needed adjustments to effectively utilize the technology. For example, response of BST in dairy herds has been shown to be directly related to the quality of management in herds. Herds with effective health and nutrition programs, efficient milking practices, and proper environment respond more positively to BST than do herds with subpar management.

Biotechnology is not a product that will make a below average manager an above average manager. On the contrary it will likely magnify the weaknesses. Management and production intensity need to be at a high level before adopting innovations. Do not use technology to try to replace good management. That would be a formula for disaster. The management capacity of below average managers must be improved for effective product utilization. The premium for top-level management will grow.

Programs aimed at developing and nurturing intensive management are needed. Management effectiveness will

be a dominant variable in, and must precede, successful adoption of technological advancements.

Marketing

Some biotechnological developments may lead to production of specialized products. This will increase the need for effective marketing to take advantage of any product premiums. This too may require product identification from producer to consumer. Open markets typically do not handle identification and separation of specialty products well. The needed marketing techniques, such as production and/or marketing contracts, may expand for this type of product.

Producers need information on management strategies and systems necessary to adopt and use new biotechnology products. Development of this information may eliminate much trial and error in the adoption process.

How will information on these products be developed and distributed to producers? And by whom? Private and public resources are both needed, though the most effective combination is open to debate. The demand for consulting services, both public and private, will likely increase, as it will be very difficult for operators to remain current on all factors affecting all enterprises on the operation. Only the highly specialized and large operations will be able to develop their own information base. Other farmers will need to incorporate some of this information from outside sources.

Rural Development: A Farm Manager's Perspective

Rural development is often overlooked by farmers, agribusiness groups, and agricultural policymakers. When things are going well on the farm, these agricultural groups express concern over the well-being of the rural community. But when farm prices drop or the weather turns dry, attention will quickly be refocused on more immediate concerns. Rural development seems to be forever buried in the back of farmers' minds, well behind the primary concerns of production and prices and even the issues of pollution, conservation, and structure. This may not be the proper ranking on a farm policy agenda, and certainly it is not an appropriate position in the minds of farm managers. Rural development should be a primary concern of all farm managers.

What a Farm Needs from Its Community

Most farmers agree that it takes good weather and high prices to make a farm prosperous. These are probably the two most important factors in determining whether farming in general is prosperous. But farm managers should be fo-

cusing their attention on the relative factors—what makes one farm successful and another one a failure. Most of the difference is the farm manager, but not all. The community in which the farm is located also has an impact on the likelihood of success. The days of the self-sufficient farmer have long since departed. A modern farm makes great demands on its community.

Supplies. Replacement belts for the combine, medicine for the calves, chemicals, fuel, seeds, feed—the list of supplies needed to keep a farm running can seem almost endless, and most of it is purchased locally. If it is not available locally, the farm manager is faced with two options—either plan ahead and carry the inventory on the farm or sacrifice timeliness and wait for the needed item to be brought in from a distant source.

Financing. Much of American agriculture is financed by local banks. The availability of local sources of financing is quite uneven. In Missouri, we currently have communities in which the bank is aggressively trying to make more quality farm loans and communi-

Ronald L. Plain, Associate Professor of Agricultural Economics, University of Missouri-Columbia, Columbia, MO

ties where the bank is trying to get out of farm lending entirely. There are also communities where the only bank in town has stopped operating. For large farms, having to deal with a distant lender may be only an inconvenience. For small farms, the lack of a local lender may be critical. Many lenders feel that the added cost of servicing and supervising a distant loan can only be justified on large loans. Trying to go outside your community to borrow \$10,000 of operating money can be difficult.

Service. A great deal of the “products” farmers purchase are actually services. Everything from tractor overhauls to crop dusting to income tax preparation to veterinary services can be vital items the farm needs to purchase. The local availability of quality, affordable farm services can be a major factor in the success or failure of the farm business. Unlike supplies and financing, services imported from outside the community can be quite difficult to obtain. Bringing in services usually means bringing in people and that can be expensive. The alternative, settling for veterinary or tax service from local people who are not familiar with your type of farm, can be even more costly.

Personal Items. Farmers are people, too. In addition to all the products and services the farm needs, the farm family also needs things. The availability of household goods, recreational activities, health care, and quality schools will affect the degree of satisfaction the farm manager and farm employees will gain from being involved in the farming operation.

One result of the demand for goods and services from local communities is that agricultural commodities become more geographically concentrated and farms become less diverse. The dairy

industry in Missouri is concentrated in the Ozarks region around Springfield. As an economist, I am hard-pressed to explain why dairy farms continue to expand in this area and decline in the rest of the State. Other parts of Missouri appear to have a cost advantage in producing the forages and grain that dairies need. The factor that seems to tip the scales in favor of the Ozarks is the advantage of operating a dairy farm in a community that is composed largely of dairy farms.

Experts in retailing have pointed out that the best place to locate your store may be right next door to your competition. The result can be seen in the cities of rural America. Every fast food restaurant in the area will be located along a half-mile stretch of the “main drag.” In addition to the incentives for the concentration of farm type provided by climate and soil type, community services and support also move farm type in the same direction.

Money and Jobs for Rural Communities

The interaction between the farm and the local community is so strong that the economic condition of one can have a major impact on the well-being of the other. Prosperous farms mean money and jobs for their communities—not only jobs on the farm, but also jobs in agribusiness (the myriad firms selling inputs to the farm and buying farm produce), jobs in nonagricultural firms such as furniture stores and car dealerships that sell goods to farm families, and jobs in government as farm sales generate tax dollars to support everything from roads to schools to hospitals.

The sudden absence of farm profits can have a devastating impact on the economy of rural communities. As rural America discovered in the 1980's,

the lack of farm income can migrate through the local economy as first the agribusinesses then the retail and service businesses feel the decline in sales. Eventually, the governmental sector is affected as declining sales, declining property values, and a declining population produce lower tax revenues.

Security for Local Farmers

Most farmers are aware of how the economic health of agriculture affects the well-being of rural communities. Fewer understand that the reverse is also true. A prosperous community can be supportive of a lagging farm economy. Missouri agriculture was hard-hit by the tough financial conditions of the early 1980's. The result was devastating to many rural communities, especially North Central Missouri towns like Princeton, Trenton, and Unionville which had economies based heavily on agriculture. Communities such as Auxvasse, where I live, fared much better. Located within commuting distance of the growing nonagricultural economy of Columbia, MO, farm families in this area were able to supplement their farm incomes by having one spouse take a full-time or part-time job in town. The results of this infusion of off-farm income were fewer bankrupt farmers and less of a drop in local land prices.

Establishing a farm business near a thriving community that does not depend on agriculture can cushion the fall from a collapse in the farm economy. Working to diversify the economy of agriculturally dependent communities can accomplish the same result.

Symbiosis—The Farm-Community Ideal

Symbiosis is the process in which two organisms live in a close, mutually beneficial relationship. Rhizobia bacteria live in nodules on the roots of alfalfa plants. The alfalfa provides shelter and nourishment to the bacteria. The bacteria transform atmospheric nitrogen into a form usable to the alfalfa plant. Each is better off because of the presence of the other. A symbiotic relationship between farm and community should be the goal of farm managers selecting a location for their farms, of rural community leaders trying to shape their communities, and of policymakers trying to implement legislation that is beneficial to society.

Farming in the Shadow of the City

What happens to traditional agriculture when the city's shadow creeps ever nearer to the farm? The increasing proximity of urban sprawl to agricultural activities is causing wrenching changes in the farming community. Wherever the shadow of the city is evident, the "green industry" (landscaping) is usually the fastest growing, most profitable component of agriculture. There is a similar increased demand for specialty produce, including organic fruits and vegetables, and for decorative items such as gourds and Indian corn.

In New England, an area ideally suited to dairy farming and apple production, some farmers are descendants of 11 generations of people who worked the same land. Though many of these farms have been incrementally improved over the years, they have been operated in fundamentally the same way for two centuries. Yet during that time, the economy of the region changed dramatically from subsistence cultivation to commercial production. Recently, the urban culture has begun to dominate the

rural scene. The main role of farm management has become one of developing and implementing the necessary strategies to make agricultural operations more compatible with the changing environment.

Fragility and Hostility

Most commercial farms in America today are technologically complex, capital-intensive businesses that require a substantial input of committed, often skilled, labor. They operate on small profit margins; consequently, they are extremely sensitive to changes in the economic, social, and physical environment. This vulnerability accounts for the high risk associated with farming. Successful farming depends directly on exceptional management expertise, the ability to grab the few exploitable opportunities that come along, and most importantly, on the ability to develop a sensible strategy.

This fragility has been exacerbated by the relative hostility of the national agricultural environment of the 1980's,

Kent Fleming, Farm Management Specialist, Cooperative Extension, University of Massachusetts, Amherst, MA

which threatens farm viability and performance. Profit, whether expressed as returns to management and labor or as returns to equity capital, has plunged to the lowest level in half a century. After a few decades of stability and growth, American agriculture in the 1980's finds itself trying to function in a more hostile, unstable environment.

Production overcapacity coupled with flat demand is fast turning American agriculture into a "stalemate" industry. Traditional agriculture has generally been considered to be a "mature," but stable, industry; in some areas farming is now starting to show some of the disturbing signs of decline. Survival could well depend on farm managers adopting strategies which managers in other mature industries have used to demature their firms and put them on more solid footing.

Crowding the Country

The destabilizing force of fast-paced development can only intensify the hostile climate for agriculture that farmers have battled throughout the past decade. The encroaching city creates complicated management problems that add to the pervasive agricultural problems that underlie farming even under favorable circumstances.

The influence of the city, for example, raises the opportunity cost of farming. When land values increase from \$1,500 an acre to 20 times that figure in 5 years, it is impossible for farms to expand. In light of the high opportunity cost, some farmers wonder how much longer they can afford to use their land for agriculture.

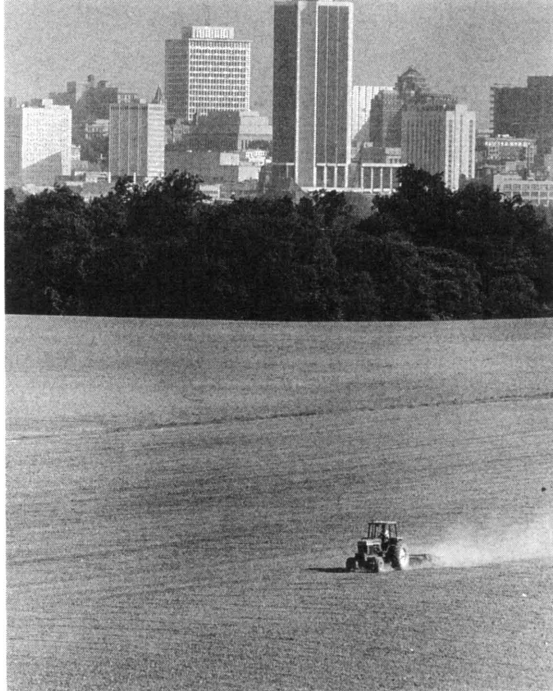
In New England skyrocketing land prices, along with the Federal Government's Dairy Termination Program, have devastated the region's dairy industry. Massachusetts has lost one-third

of its dairy farms over the past 3 years. Some speculate that the current decline will culminate in the extinction of the State's dairy industry. Federal policy has been somewhat tempered by local and State policy, especially regarding property taxation (reduced or zero property tax on land used for agriculture) and the purchase of development rights (for example the \$60 million Massachusetts' Agricultural Preservation Restriction Program).

Hundreds of land trusts are working to reduce the opportunity costs of farming in areas where the city has encroached. State and local governments have devised complex, multimillion dollar efforts that have made a significant impact. Even with these programs in place, the problem is proving to be overwhelming.

Many people move from the city to commuting-distance rural areas for the ambiance of rural living. Soon after these people arrive in the country, they often object to odors and noise from normal farming activities, as well as to the use of sprays of any kind. In 1988, Massachusetts residents had to vote in a referendum on whether to prohibit the confinement of farm animals. When surveyed recently about the problems they face today, farmers reported that their single greatest concern is the harassment they perceive from the surrounding community—a concern even greater than high interest rates, low crop prices, and government policy and regulation.

Land-grant university research and Extension programs have attempted to respond to these social pressures on farmers, and have devised some creative ideas. For example, new disease-resistant apple varieties and efficient pest-management strategies have reduced the amount of pesticide spraying. These activities have lessened the



*Farming in the shadow of the city—in Richmond, VA
(USDA Photo by Tim McCabe, VA-5276-21)*

impact of farming on the environment, and have often led to lower costs and increased profitability. (See Part V, Chapter 5 on integrated pest management.)

While New England farmers work in the backyard of an increasingly prosperous urban economy, most of them—especially those producing traditional commodities such as apples and dairy products—have found it difficult to tap the local market and must instead face extremely tough out-of-state competition.

Many State Departments of Agriculture are helping to promote and market selected local products. But there has been limited success in keeping the farmer's price for certain crops on a par with the rest of the economy, and in helping the farmer capture a greater share of the consumer dollar. With a 2-percent unemployment rate, fast-food chains must offer unskilled workers wages of more than \$6 an hour. Conse-

quently, apple farmers must import their harvest labor from places such as Jamaica and pay them \$8 an hour. And not every farmer is lucky enough to find and keep labor at that price.

Ultimately, profitable farming in the city's shadow requires more than incrementally improving markets or farming practices. The top priority for farm management in this more hostile, less stable environment is the search for better, more effective strategies. Some farm managers have developed workable strategies, and they are surviving, even thriving. Others in similar situations are having trouble.

Four Strategies

Farm managers who face hard times due to encroaching urbanization can choose from four basic strategies to ward off economic disaster: divestment, harvest, niche, and cost leadership. Most managers of declining farms focus on the former two, but creative farmers

give more serious attention to the latter two. The reasons are simple: divestment and harvest strategies deplete the farmer's resources; but finding a niche in the market and applying cost leadership offer new opportunities for growth.

Divestment. Quick divestment consists of selling off the farm's assets. Farmers in urbanizing areas usually sell their land to nonagricultural buyers who, in turn, develop it for nonagricultural purposes. Few New England farms on the real estate market, for example, are actually sold to other farmers. Fortunately, land trusts and other programs in the region are providing farmers with incentives that create an alternative to merely selling out to the highest bidder.

Social and economic changes are occurring so rapidly in some rural areas, however, that stabilizing the land-use crisis has thus far proven impossible. This situation contrasts sharply with more rural areas of the country. In these rural areas, where the market value of agricultural assets has decreased, existing farmers who must divest typically sell out to other farmers at prices that do not make farming prohibitive. In this way, the buyer becomes a low-cost producer relative to existing farmers, and becomes more competitive.

Harvest. This is a "hang-on-until-better-times" strategy. The manager seeks to maximize the cash-flow, and necessarily must take a short-range view. The harvest strategy eliminates or severely curtails investments in new machinery, maintenance, and other long-term needs. Harvest is a relatively demoralizing strategy for all concerned. It is also risky, often leading to divestment. Yet most farmers, both within and outside of the city's shadow, appear to be committed to this strategy.

Niche. The goal of this strategy is to identify a segment of the market for which demand will remain stable, decline more slowly, or perhaps grow with the increasing influence of the city. This strategy often means selling a different (usually higher priced) product from the same basic production process.

Apples provide an example where the niche strategy works. Like dairy farms, apple farms demand huge capital investments, intensive labor, low wholesale returns, and fixed assets with little other use. In short, they offer little flexibility and few opportunities to exploit more profitable alternatives. Apple producers typically sell most of their crop wholesale for \$5 to \$6 per bushel. They might sell a few bushels at a roadside stand for twice that price, but because this marketing effort requires extra labor, it is a questionable enterprise.

Yet by finding a unique niche in the market, apple producers have increased their profits. For example, a couple on a hilly, picturesque, remote 49-acre apple orchard was struggling to make payments on their borrowed capital and to resist the real estate offers on their property. Divestment occurred to them, but they did not want to consider that option seriously. The couple had invested 15 years of savings in their land and as many years planting and caring for the orchard. Initially, almost by default, they had fallen into a "harvest" strategy—maximizing cash-flow by avoiding maintenance and further investment. A supplementary off-farm income enabled them to keep operating.

Marketing an Experience. They had tried a small roadside stand but for various reasons, not the least being their out-of-the-way location, the enterprise had never yielded more than wholesale

prices. They also tried a pick-your-own program, which had seemed promising because it eliminated harvesting costs and returned more per bushel than selling wholesale. But this enterprise, too, was short-lived, in part because it was geared to saving customers money. High incomes in the area did not warrant such a marketing strategy.

As the fruit growers saw the city's shadow approaching, they carved a niche in the market to provide a new service: rather than selling apples per se, they decided to market the experience of coming to the country and participating in a harvest. Fortunately, they had planted a wide variety of apples, which allowed them to teach customers about these varieties—when they ripen, how they taste, how they can be used.

A horse drawn cart takes the pickers to the spot where their apple of choice is growing. Picking apples away from sounds of traffic, picnicking in the midst of panoramic vistas, and getting away from other people all combine to offer customers a different product—an experience. Far from trying to save money on apples, these people are more interested in quality produce plucked in an enjoyable environment.

Within a year, the couple was able to build a large wooden post-and-beam building on their farm to serve as apple storage shed and sales room. The structure contains a commercial cider press and a kitchen where local people produce jams, apple butter, and fresh bread for sale. Commitment to this strategy has turned the operation into a profitable business. This “de-matured” traditional apple farm has also enlivened the economy of the whole community by providing a processing facility and an outlet for the neighbors to market their own goods.

Yogurt and Ice Cream. Dairy producers have been equally creative in finding niches. Many are now adding value to their basic product, milk. A number of dairy farmers are now bottling their own milk, producing organic yogurt (made from organically fed dairy cows), and making ice cream. Many are producing gourmet-type cheeses, such as gouda or camembert, rather than relying solely on bulk processed cheddar or American cheese.

A characteristic of these niche strategies is that they do not compete directly with mass-produced, mass-marketed, low-cost farm goods. The specialty products typically sell above supermarket retail prices. Niche strategies depend on a relatively local, predominantly urban, quality-conscious buyer. Finally, these strategies allow the farm to continue agricultural production in roughly the same manner as before.

Cost Leadership. The purpose of this strategy is to produce the same product, but at a lower cost. The cost leadership strategy is more than mere cost-cutting—it involves systemic changes that enable the producer to become a low-cost operator relative to the competition.

Perhaps the most successful example of a recent systemic change in farming is the incorporation of the intensive, rotational grazing system into traditional New England dairy operations, an innovation that has in large part been imported from New Zealand. The system consists of dividing up pasture areas into small paddocks and moving the dairy cows (or beef and sheep) from one paddock to the next every 12 to 24 hours, depending on the amount of grass the animals eat. The principle is to allow for regrowth between rotations and

to let the animals forage at the grass's peak nutritional state.

Two brothers were operating a 73-cow dairy farm as their full-time jobs, but they were not earning enough to support their families. They had limited access to land, labor, and capital—all of which made growth infeasible. Furthermore, they had questions about expansion when they were already having difficulty managing their current operation. They were committed to keeping the farm, so divestment was out of the question (unless it was forced upon them). Analyzing their farm records, it was easy to foresee a dismal future if they continued along the same path.

New Approach. They spent \$2,000 on a high-voltage New Zealand-made charger and lightweight New Zealand fencing to divide 35 acres of their best pastureland into half-acre paddocks. For 6 months they rotated their herd after every milking. Milk production increased slightly the first year, while grain costs dropped 40 percent.

The brothers also had ample time to complete the farm work because the cows did most of the harvesting and feeding, not to mention manure management. Most important, their profit increased by approximately \$15,000—the amount they saved on grain.

The next year, this white clover controlled grazing strategy produced even more generously. It was now possible for one person, with a little help at milking, to operate the farm. And the pasturelands supported the feeding of almost twice as many cows.

In the end, they decided against expansion. Instead, one of them took a full-time off-farm job. Half of the year's feed requirement now came from controlled grazing. They bought two-thirds

of the remaining half of their forage requirements. The final one-third came from the first cut hay—provided by the forage the animals were unable to keep up with in early spring. Since most of their feed now came from grazing or purchased hay, they had little reason to keep their haying equipment. The brothers decided to hire a contractor to bale the first cutting of hay, and to sell off all of their machinery assets. This move reduced their debt substantially.

Problems Remain. In spite of such innovations, the overall economic climate for dairy farming remains unstable and hostile, and the dairy industry is in a state of decline. Sadly, New England dairy farms continue to fail at an alarming rate. But a change in strategy from harvest to cost leadership has moved this farm in 3 years from a crisis situation into a profitable, comfortably managed business.

Beating the Odds

Niche and cost leadership strategies have worked to revitalize some farms in the mature apple and dairy industries of New England. Some agricultural experts argue that if milk and apples can be produced elsewhere and delivered to New England at cheaper prices, we should let the free market determine the fate of the local farmers. But the farm managers who have committed themselves to niche or cost leadership strategies will continue to farm successfully in the shadow of the city.

Tomorrow's Farm Managers: Who Will They Be and How Will They Learn?

The changing agricultural environment has wide-reaching implications for farm and ranch managers of the future. A turbulent business environment arising from increased integration of the agricultural sector into the national and world economies, technological change, projected changes in Government regulations, and expected changes in weather patterns will create new challenges for managers of farms and ranches.

Other changes are occurring in the agricultural sector that will affect the types of skills farm managers need; these include the movement toward fewer and larger commercial farms, a proliferation of part-time farmers near urban areas, increased vertical integration in livestock production, and increased involvement of lending institutions in farm management and ownership. These changes affect the way farms and ranches are managed, the knowledge tomorrow's managers will need, and the forms their training will take.

Tomorrow's managers will be fewer in number, better educated, and more diverse than those of yesterday. They will use a broader set of managerial skills to meet the challenges of the turbulent business environment of the future. And they will have access to new information and management skills that go beyond their formal education. This continuing educational process will take many forms, ranging from technology-based information transfer to intensive management development programs.

Tomorrow's Managers

The challenges of managing the farms and ranches of tomorrow will be met by a wide and diverse group of managers. Farming is a business, and the successful farm operation will be managed as a business. The farms may be owned and operated by families, partnerships, or corporations, but the management will rely on business skills for success.

Robert H. Hornbaker, Assistant Professor of Farm Management and Production Economics, and
Michael A. Hudson, Associate Professor of Agribusiness Management and Marketing, University of Illinois at Urbana-Champaign, Urbana, IL

While experience is one method of developing these business skills, continuing education and training combined with farm experience is a faster, less risky means of developing sound business skills and practices.

The traditional types of farm business entities—sole proprietorships, partnerships, family corporations, and other corporations—will continue into the future. However, two new types of farming operations may become more prevalent in the future:

- Professionally managed farming operations—typically operated by lending institutions, farm management companies, or insurance companies—will be managed by a wide range of individuals, with backgrounds similar to managers employed by corporate farming operations.

- Vertically integrated production operations are becoming increasingly prevalent in livestock production and may increase in grain production as new technologies emerge. Management depends on arrangements between the production operation and the integrator, who often plays an important role in continuing education and professional development of these managers.

Skills Managers Will Need

Tomorrow's farm and ranch managers will need an expanded set of managerial skills to succeed. Managerial skills in three areas—communication, business and economics, and technology—will be developed through formal university education, business experience, and continuing education.

R.P. King and S.T. Sonka have identified five areas of management skills that tomorrow's farm and ranch managers will apply to a broad set of problems:

Managing Innovation and Change.

Changes in technology, information, and marketing systems are occurring at an increasing rate. As this rate of change continues, farm and ranch managers will be forced to adopt new practices and employ strategic thinking to survive. Changing consumer demand also will require increased innovation to fill existing or developing market niches.

Managing Risk. The growing exposure to global competition in production and financial markets; changing Government policies related to trade, supply, and the environment; and changes in climate require new managerial skills in dealing with risk. Tomorrow's farm and ranch managers will be forced to use the futures and options markets, contractual arrangements, and other risk-shifting tools to manage these risks.

Designing Effective Organizations.

As the structure of farms and ranches evolves over the next several years, managers will confront many organizational challenges, including the need to develop organizations that use labor effectively and that can take advantage of new relationships with buyers, suppliers, and competitors.

Designing Information Systems. Increasing information and rapidly evolving information technologies create a distinctive set of challenges for farm and ranch managers. Practical information acquisition systems and computer decision support systems will continue to be developed to aid managers in this area.

Managing Human Resources. As the average size of commercial farms increases and the number of part-time farmers grows, human resource problems will become more important to farm and ranch managers. These prob-

lems may be exacerbated by absentee land owners and managers. The challenges of dealing with more seasonal employees, reliance on specialized personnel, and expanded interactions with suppliers, buyers, and processors are likely to occupy more and more of the farm or ranch manager's time. The part-time farmers will face the need to balance farming demands with off-farm employment.

Strategic Planning

In addition to developing these five specific skills, farm and ranch managers will have to be strategic thinkers, capable of dealing with a turbulent environment by using the techniques and tools of strategic planning. (See Part II, Chapter 1 on strategic planning.) These techniques will aid in managing technological innovations and in dealing with changing governmental policies, markets, weather, and business. Although based on theory and technical knowledge, these skills will best be developed through case study learning experiences.

Global Marketplace

The managers of tomorrow's farms and ranches will need to understand agricultural production and marketing in the global marketplace. This implicitly includes an understanding of consumers and their evolving needs. As the firms that farm and ranch managers deal with as buyers, suppliers, and competitors become increasingly global, the managers of the production operation will need to understand their needs to better develop working relationships. In addition, exciting opportunities may exist for cooperation between individual farms and ranches or among groups of farms and ranches, particularly in sat-

isfying consumer needs by filling niche markets. Farm managers will likely learn about changing consumer needs through nontraditional study—including internships, study abroad programs, and various conferences and institutes.

Computers as Management Tools

The farm and ranch manager of the future must also be computer literate. In addition to serving as a valuable information-management tool, the computer will become increasingly important to the manager as a decision aid and as a means of communicating with other producers, trade associations, private firms, and government agencies. Short courses and home study will likely provide important training, as will expanded use of computer simulations in traditional classroom settings.

Farmers have always made decisions in a risky and uncertain environment. The number of factors that affect that uncertain environment has been increasing and will continue to increase. However, computer programs are now available, at a low cost, that can help farmers analyze the risks associated with their decisions. Almost all college graduates today are exposed to, understand, and accept computer technology and know it can be used to sort vast quantities of information and aid in making decisions. As past generations of farmers are followed by a computer-literate generation, demand will increase for continuing education on ways to use the latest information and technology for short- and long-term decisionmaking. (See Part III, Chapters 2, 8, 9, and 12 on computers as farm management tools.)

Markets, Employees, and Competitors

The farm and ranch manager of the future will face an increasing need to understand the behavioral aspects of markets, employees, and competitors. Increased understanding of the liberal arts, as well as business concepts and practices, will be important. Effective networks among peers will also help. These needs will be best addressed through traditional educational programs, ongoing home study, and professional education programs through trade or grower associations.

Multiple Training Sources

To train tomorrow's farm and ranch managers, existing educational programs are likely to be modified—with a great deal of supplemental support from what might be termed nontraditional sources. The following will be key sources of training for tomorrow's managers:

Formal College Education. The land-grant universities will continue to provide training in the technical skills needed by farm and ranch managers—with an increasing reliance on agricultural economics, communications, and business departments to fill in the communication, economic, and business skills noted above. In addition, nonland-grant educational institutions are likely to continue to focus on technical training with a business orientation; however, they will continue to be regional in scope. Graduate education for farm and ranch managers is likely to become increasingly important, with many farm managers pursuing MBA degrees (with an agricultural or agribusiness specialization in some cases).

Management Development Programs. Colleges and universities are likely to continue to provide manage-

ment and executive development programs for nontraditional students for farm and ranch managers, particularly the "sundowners" (part-time farmers living near urban areas). These programs will offer nondegree courses on specific topics related to managing the farm operation and may build sequentially toward a certificate of completion. The divergence in types of farm managers will lead to development programs for particular management segments. For example, programs will address the needs of large commercial grain operators, vertically integrated livestock producers, and small part-time operators.

Extension Education. The role of Extension in farm and ranch manager education is likely to change significantly. In part, this is due to the nature of many of the subjects now taught—many of which require longer periods of study that are more like regular courses than traditional 1-day Extension meetings. As a result, we are apt to see more continuing education Extension efforts, with farm and ranch managers relying on the traditional Extension meetings for informational updates. However, the informational update meetings are likely to decline as a source of information for commercial farms while becoming more important for part-time farmers as changes continue in information and technology transfer.

Corporate Training Programs. As agribusiness firms involved in supplying inputs to farms and ranches seek new ways to build loyalty among their customers, they will offer more training programs. Many of these programs will focus on specific management or technical skills associated with new technologies. Firms that own farms and ranches will seek to provide educational

programs for their professional managers. Access to these programs will be selective—dependent on the manager's association with the firm.

Home Study Programs. Enhancements in computer and video technology, along with increased communication among managers, will lead to greater use of home study materials by farm and ranch managers. A broad range of educational materials on management skills—ranging from technical to operational—will be included in these home study programs. However, the home study programs will need to be targeted toward a particular segment of the diverse group of farm managers. Private consulting firms may develop customized study courses for the manager's home operation. The course-based Extension efforts noted above will likely include home study programs. Finally, as technology continues to evolve, we are likely to see educators developing and delivering home study courses—perhaps in conjunction with television broadcasts.

Professional and Trade Associations. The expanded global marketplace will likely enhance the role of professional and trade associations. As these groups strive to increase membership, they are likely to offer short courses that will enable farm and ranch managers to build a network of contacts across the globe, and also gain specific knowledge. These programs, which will likely require participants to pay a fee, may become an important source of management training, particularly in the area of strategic thinking and global issues.

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